IN THIS ISSUE: Merchandising Progress on the Pacific Coast

JOURNAL OF ELECTRICITY

VOL 43 NO. 7 SAN FRANCISCO, OCTOBER 1, 1919 PER COPY, 25 CENTS

2

THE SATURDAY EVENING POST October 4, 1919

Hotpoint

You might select the word
characterize your Hotpoint
On the other hand
comfort wh

EDISON ELECTRIC APPLIANCE CO. INC.

Hotpoint Edison Hughes

NEW YORK 141 WAVERLY PLACE

5660 WEST TAYLOR STREET

ATLANTA 24-26 PEACHTREE ARCADE

ONTARIO CALIFORNIA

CHICAGO, ILL. September 1st, 1919.

ADDRESS ALL COMMUNICATIONS TO THE COMPANY ATTENTION OF THE WRITER

TO OUR HOTPOINT CUSTOMERS:

The outlook in every line of business for the Fall and Holiday season is especially bright. In fact, many feel it even surpasses the hoped for condition predicted by the most optimistic. The brisk market conditions of the last 30 days indicate very clearly the confidence in this situation of almost every line of business activity.

This condition has thrown a very heavy burden upon the electrical manufacturer. Almost over night, we have been called upon to double, and in some cases even treble our output to take care of this unusual demand. It is difficult to meet a sudden increased demand such as this, because it takes time to secure quantities of raw material. Skilled help cannot be quickly obtained because of the uncertain labor market.

Contrast with this situation the haberdasher who ordered his Fall hats last Spring, and the shoe merchant who has had his order for footwear in for eight or nine months. The manufacturers of these lines have six months or more to take care of these orders.

We, however, anticipated, to as great an extent as possible, this critical situation, and have made every possible plan to take care of our Fall and Holiday trade, and thus give our customers the best possible service.

I suggest that you canvass this situation very carefully. If you have not put in your order for Hotpoint Appliances--send it to your jobber NOW. The slogan "Do Your Christmas Shopping Early" will be more prominently used this year than ever before. Will your stock of Hotpoints be in shape to take advantage of this early trade?

Our advertising for the Fall and Holidays will be continued, of course. We take pleasure in sending you a reproduction of our October Post "ad" These will be followed by two more beautiful advertisements - a two color center spread in the Post on Nov. 29th and a four color insert in the December Ladies' Home Journal. These will increase the already marked demand for Hotpoint Appliances

Coupled with this, we will soon have a very attractive window display for the Holidays and a complete and extremely attractive line of co-operative helps.

So order your stock NOW.

Yours very truly,
H. A. Hughes
PRESIDENT.

SEE OUR EXHIBIT

CHICAGO Electrical Show COLISEUM OCTOBER 11 TO 25, 1919

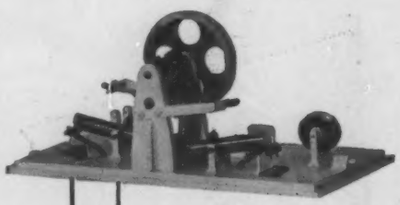
EDISON ELECTRIC APPLIANCE CO. INC.

NEW YORK CHICAGO ONTARIO, CALIF. ATLANTA

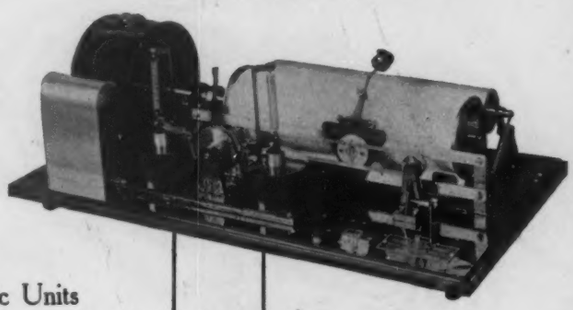
Stevens Long Distance Water Stage Recorders and Indicators

Let Stevens Recorders Plot your Hydrographs

Place this over the water



Place this in your office



Records every change of levels

English or Metric Units

—

Requires only one Wire

Long Distance Duplex and Differential Recorders and Indicators

—

Direct float operated Recorders

Type A runs from one to six months with one setting

Type E low priced, 8-day, dust and fool proof

Duplex and Differential Recorders

Any number of Recorders or Indicators in parallel

—

Mount this on switchboard

Can be operated on telephone lines

Write for Details and Prices

Leupold, Voelpel & Co.

Manufacturers of Scientific Instruments

Portland, Oregon, U. S. A.

JOURNAL OF ELECTRICITY

FOUNDED 1887

ROBERT SIBLEY, Editor

VOLUME 43 · SAN FRANCISCO, OCTOBER 1, 1919 · NUMBER 7

Contents

EDITORIALS 291

Rampant Sinister Forces—Salesmen's Auxiliary to Aid Campaign—The Personal Need of the Engineer—Incidental Publicity—Water Shortage an Electrical Opportunity—The New Standard of Living—Electricity in the Pan-Pacific Field—Self-Profit Theme for Publicity—New Journal Service.

JUST JONES STARTS AN ELECTRICAL STORE — by J. H. Moseley 294

The ins and outs of setting up a retail business, with a personal and practical discussion of the things which one electrical retailer has found to be determining factors in success.

DEVELOPING NEW BUSINESS — by W. S. Byrne 296

One way of solving the problem attendant upon increased cost of production, and some practical hints as to where to limit expenses.

EFFECTIVE HOUSE WIRING PUBLICITY — by William Bliss Stoddard 300

Experiments in house-wiring campaigns with samples of successful advertising ideas that catch the public eye.

THE SALESMEN'S AUXILIARY — by Howard Angus 302

An account of the organization personnel and working plans of the newest adjunct to the field of the California Electrical Cooperative Campaign.

MODERN STEEL-MAKING BY ELECTRICITY — by Harry Etchells 319

A description of the construction, principles of operation and capacity of a successful electric furnace for the making of steel.

ELECTRICAL DEHYDRATION OF OIL — by H. N. Sessions 313

The economy of time and expense and the very much superior results achieved by electrical dehydration as compared with older methods.

NEW ELECTRIC GENERATING STATION AT DENVER — by H. H. Kerr and T. O. Kennedy 306

A full description of the equipment and operation of one of the important new plants of the intermountain district.

LIBRARY SERVICE IN A BUSINESS ORGANIZATION — by T. D. Schaftchenko 320

How a business library is conducted in a large electrical concern, and the important and efficient service which it renders.

The Journal of Electricity Cup ..... Frontispiece
Western Ideas 298
Pensioning Employes 301
Cooperation as a Bankable Asset 304
Reconstructing Hydraulic Units — by Chas. H. Tallant 308
A Record in Quick Construction 309
Engineers of Yesterday — by A. L. Jordan 312
Pulverized Coal as Fuel 313
Practical Lessons in Electricity — by H. H. Bliss 316
Repairing Boilers of Steamships by the Electric and Oxyacetylene Processes 318
Simple Device Determines Phase Rotation — by W. C. Heston 319
Sparks 322
Personals 323
Meetings 325
San Francisco Electrical Development League—by A. E. Wishon 327
California Electrical Cooperative Campaign 329
Happenings in the Industry 331
Latest in Everything Electrical 333
Books and Bulletins 334
New Electrical Developments 335

TERMS OF SUBSCRIPTION: United States, Cuba and Mexico 2.50 per year; Dominion of Canada $3.25 per year; elsewhere $4.00 per year; Single Copies, current month 25c each.

Entered as second class matter Jan. 1, 1917 at the San Francisco Post Office

PUBLISHED SEMI-MONTHLY BY THE

TECHNICAL PUBLISHING COMPANY

ELECTRIC BUILDING, 171-173 SECOND ST., SAN FRANCISCO

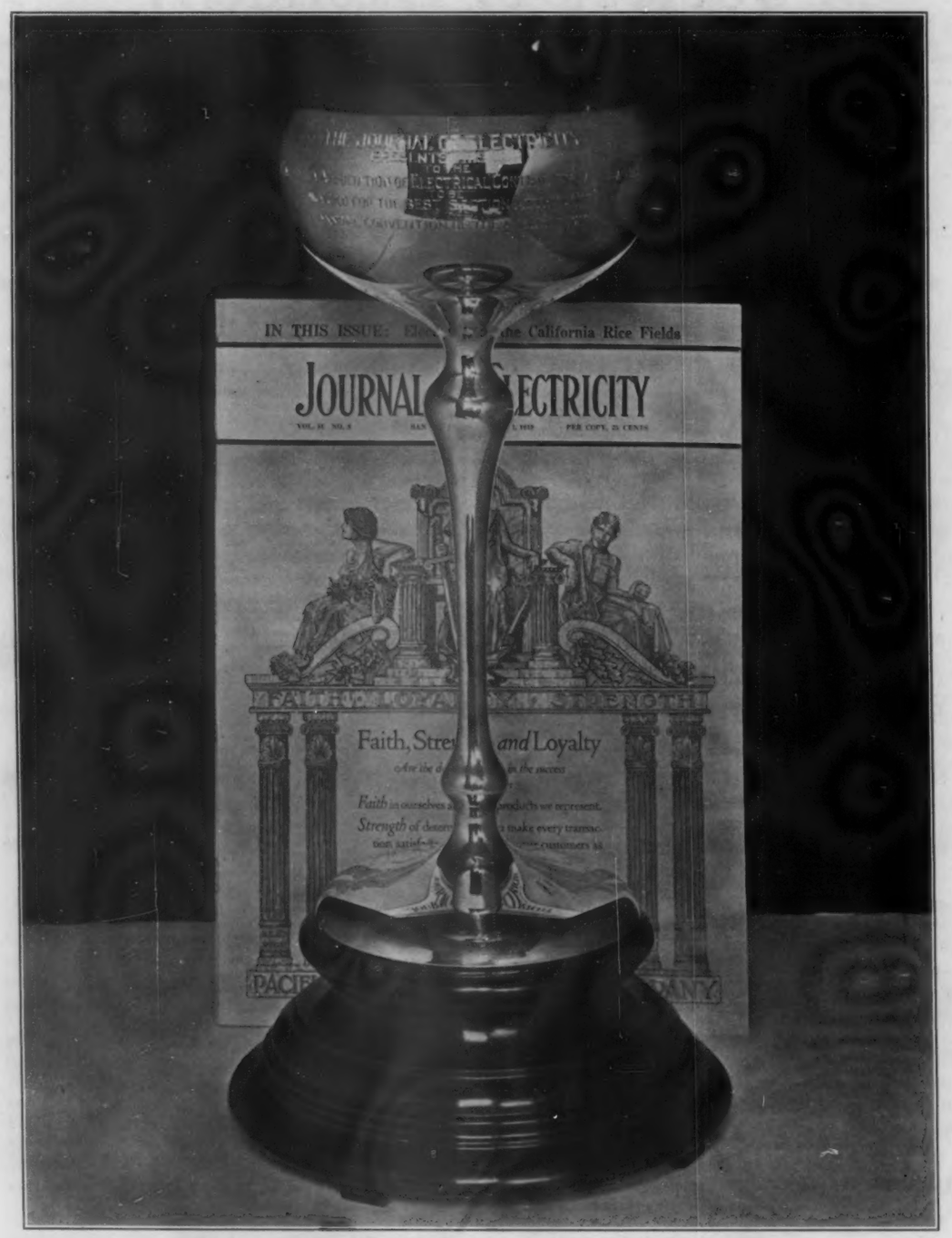
Member Audit Bureau of Circulation

WILLIS M. DEMING
President & General Manager

ROBERT SIBLEY
Vice-President & Editor

ARTHUR H. HALLORAN
Secretary

Index to Advertisers—page 20 Where to Buy in the West—pages 21-26



THE Journal of Electricity believes in the Convention idea. It believes in the cooperation fostered by mutual understanding which grows out of these gatherings of men working along similar lines. In encouragement of this constructive factor in the electrical West, the Journal of Electricity has offered this beautiful cup to be awarded at each annual convention of the California Association of Electrical Contractors and Dealers for the best section or district attendance at the convention. At the recent quarterly meeting of the Association the initial award of the cup was made to the Modesto district for a record attendance at Santa Cruz. It is hoped that this concrete embodiment of the ideal of cooperation may help to bring about even wider personal contact among the contractor-dealers of California and a closer working together of all forces for the betterment of the industry.

OCT -7 1919 ©CLB438079

JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 43 SAN FRANCISCO, OCTOBER 1, 1919 Number 7

(Copyright 1919 by Technical Publishing Company)

RAMPANT sinister forces, more subtle and more powerful for harm than the hordes recently arrayed against the allied nations of the world, now confront them in industry, on the farm, in the home, even in the legislative halls of the people. These forces may be personified as six strong devils — suspicion; fear of unemployment; industrial agitation; extremist propaganda; economic fallacy; unfair division of profits and products. You are a part of the great fabric that holds the social order together. What are you personally — individually — doing to keep your consciousness clear from the machinations of these destructive demons? How are you aiding the world at large to advance; helping with your own clear thought, your utmost sympathetic effort in behalf of humankind?

Salesmen's Auxiliary to Aid Campaign

A forceful factor has been added to the California Electrical Cooperative Campaign by the institution of the Salesmen's Auxiliary. This plan, as outlined elsewhere in the present issue, involves the appointing of select committees of salesmen in the chief distributing centers, commissioned to go forth as mobile missionaries of good business.

The new activity supplements the labors of other agencies. The seven members of the campaign committee have worked well and wisely; the three field agents have carried into execution the program as it has developed. The Journal of Electricity and Electrical Merchandising have furthered with utmost zeal the progress of the cooperative movement. Yet the spoken word is a potent influence where perhaps the printed word might pass unnoted. It is a master stroke thus to secure for the campaign an auxiliary committee of 50 better-business gospellers, glad to voice the message formulated by the leaders.

This new policy insures an intimate knowledge by all of these active salesmen of the principles underlying the campaign. That alone is a vast gain. Moreover, through their explicit appointment a duty has been skilfully imposed upon these men, and is cheerfully accepted.

This will prove an ingenious device for securing the best work to prosper the cause. The thing has been done in an unusual way. All salesmen might have been casually appointed an auxiliary "committee of the whole," but such general commissions appear always to be only half-heeded. They carry slight sense of responsibility of accomplishment. What was needed was what was done—specific appointment, designation by titles. Justly does this forward movement in the electrical trade merit to be called a campaign, for it is being carried on with military precision and all the finesse of strategy.

The Personal Needs of the Engineer

It is an astonishing thing that it has become necessary seriously to discuss the question of whether the engineering profession shall join in the labor union movement. The formation of union groups among engineering draftsmen is contemplated—has, indeed, already taken place in such instances as among the employes of the Board of Public Works of San Francisco. When it is considered that many engineers start as draftsmen, the drift of this tendency is apparent. The question has been brought up more openly, moreover, by certain of the more radical element among the engineers themselves.

Although, of course, there is little likelihood that this radical departure will make extensive headway among the engineering group, it is but one phase of the demand for a recognition of the personal needs of the engineer which is a growing force in engineering circles today. The new organization which calls itself the American Association of Engineers is in some measure an attempt to meet the same need through channels felt to be more appropriate to professional standards.

The purposes of the movement are natural and wholesome, and were it not that it comes as a competitor to the great national societies already existing, it would be generally welcomed among forward looking engineers. However it seems possible that the need may be met through the present plans of vitalizing the national societies. Joint Councils of Engineering Societies have already met various local

situations in the West. There is a plan on foot in California for a State Council of Engineers and a probable extension of the cooperative idea on a nation-wide scale.

The situation is one which must be acknowledged. The engineer in the subordinate position has felt himself neglected by the engineering organization of the old type and has started a group of his own with the avowed purpose of bettering his position financially where he is underpaid, of helping to get himself a new position if nothing else is to be done about it and of bettering the cooperation between engineers and their standing as citizens, irrespective of their specialized branch of training. Either the present national societies must answer this demand of the younger engineer in some adequate way of their own or they must be content to acknowledge the new organization and turn over to it such personal functions as they do not care to handle.

Incidental Publicity

It is interesting and refreshing to note the thorough manner in which I. W. Alexander, chairman of the Publicity Committee of the Pacific Coast Section, N. E. L. A., is coordinating all the various channels of expression leading toward effective publicity in matters affecting the electrical industry. Under his proposed scheme the publicity personnel of the Pacific Coast Section N. E. L. A., the California Electrical Cooperative Campaign, the various electrical development leagues and the publicity representatives of power companies, all work in a coordinated effort in putting over, with minimum lost motion, the message of the electrical industry to the public at large.

With publicity an avowed aim of the electrical industry, it becomes interesting also to review the ordinary activities of its various branches to see if the most in public good will is being obtained from the material at hand. It is inspiring, of course, to plan for the day when Sunday papers shall contain an eight-page Electrical Section, but in the meantime, secretaries of electrical organizations are too often neglecting the opportunity of reporting meetings, effective utterances of speakers and significant action by their groups to the daily press. Individual companies are perhaps less lax in this respect, but on the whole their news is usually of lesser importance. The knowledge on the part of the public that wide awake organizations are back of the electrical industry, that a high standard of ethics is maintained, that the service which they so casually receive over the counter or at the end of the wire is the product of most careful planning, will do much toward securing the public's good will.

Such news items are obtained only by sending the announcement or report of a meeting in to the paper in question—there is no reporter sent out to such gatherings to collect the news. Other organizations obtain much publicity in this way—watch the paper and you will see announcements of no greater importance than what you may have to communicate.

The value of such incidental publicity should be recognized and a committee or individual should be appointed in every electrical organization to follow it up. It is the first step toward the special Electrical News Section.

Water Shortage an Electrical Opportunity

Anyone who has been in the western mountains during the latter part of this summer is acutely aware of the scarcity of water for both irrigation and hydroelectric use. Mountains usually white are bare of snow, glaciers are exposed and developing great fissures, rivers pitifully low, and several streams already dried up. Owing to the generous water of the spring period, storage conditions are slightly better than at this time last year, but the increased demands more than offset this advantage.

The California Railroad Commission has undertaken a survey of conditions to avert the threatened hydroelectric shortage in that state by suggesting needed improvements and additions to existing facilities. The Tulare County Board of Trade called a conference for Sept. 5th and 6th of all interests to consider the problem of increasing irrigation supplies in the San Joaquin Valley, in which the various power companies were invited to participate.

In the case of the power company the solution is largely one of adequate storage, as well as the company interchange of power to meet peak needs and the consequent more complete utilization of available resources. It is interesting to note that a second remedy has been suggested to meet the irrigation need which proposes a new power load of no mean importance. This is the drainage through pumping of water-logged, over-irrigated lands and the re-use of the water where needed. This policy has already been adopted to a great extent in southern California, with the excellent result of reclaiming the lowlands and furnishing the wherewithal to extend irrigation to lands not yet cultivated. Its extension to the more northern irrigated regions is simply a matter of time and the acuteness of the need offsetting the expense involved.

The New Standard of Living

The government has adopted the slogan of "Buy Now — but Buy Wisely" for its Thrift Campaign. Both bits of advice are needed in the present frame of the public mind—and the adoption of both is necessary for the fullest acceptance of the electric idea.

A large amount of money was put into circulation through war channels and found its way into the hands of people unaccustomed to prosperity. These people are today in a position to spend and that they are spending for clothes and automobiles and the like is testified to by the prosperity of department stores and the inability of automobile manufacturers to keep up with the demand. On the other hand prices have risen enormously, far above the reaction of the ordinary salary to their stimulus — and in consequence another portion of the population is vitally concerned with the problem of how to meet expenses

by cutting down expenditures. This perhaps is the portion most characteristic of the times.

The average family has a little less food on its table or food a little less rich, makes somewhat fewer purchases of books, goes to the theater fewer times, though oftener to the movies, gets along without a servant. In a way the standard of living has been slightly lowered. But in many respects the change is merely a substitution. If washing is done at home, it is done with an electric washing machine; if there is no servant, there is an electric toaster and a vacuum cleaner. The way of progress is to a great extent the way of economy. The typical family of the future may live simply and do its own work, but it will be supplied with electrical conveniences of every sort. The government has seized upon a profound truth in preaching that true thrift lies in wise expenditure—it is not money we get from life, but its fullest equivalent in satisfaction. The application of this theory will result in the wider use of electricity along every line of human activity.

Electricity in the Pan-Pacific Trade Field

The American electrical industry has become a tremendous civilizing and energizing force in all the lands bordering the Pacific. The time is at hand when it may fairly be stated that the stage of advancement attained by the various peoples of this area can be judged by their annual import of mazda lamps.

American electrical engineers are taking a leading part in the upbuilding of the industrial prosperity of this vast commercial realm. They find much that inspires them in the awakening of the Orient to power resources that have lain dormant for long centuries; they perceive in the three-thousand-mile rampart of the Andes hydroelectric potentialities comparable to those of our own Sierras and Rocky Mountains. Theirs is the skill that shall harness the horsepower of Alaska's storming torrents; through their ingenuity the floods of the Yang-tze gorge shall be made to serve the power needs of new China.

American manufacturers are everywhere profiting by this development. Last fiscal year the United States exported electrical machinery and appliances valued at more than $80,000,000, and no small share of this trade was with Pan-Pacific lands. To the Philippines, for instance, we sent out $1,500,000 worth of electrical material; to Hawaii, $850,000; Alaska, $400,000.

The possibilities for vast expansion of trade in Pacific lands have aroused wide interest throughout the electrical industry. The men of the American West, in particular, are to enter energetically into this field of enterprise. With them, and for them, the Journal of Electricity is making a consistent study of trade conditions in the Pan-Pacific area. The coming year, with the National Foreign Trade Congress in San Francisco, and the Pan-Pacific Engineering Conference near Batavia, Java, promises much of value to the industry. To prepare the way, so that we may gain full benefit from these conventions, the Journal of Electricity is to continue its investigation of electrical development in the Orient and Latin America, and the issue of November 1st is to be a special World Trade number.

Self-Profit Theme for Publicity

One of the greatest outstanding developments in presenting the message of the electrical industry to the people of the West is embodied in the proposal made by A. E. Wishon, assistant general manager of the San Joaquin Light and Power Corporation and president of the Pacific Coast Section, N. E. L. A.

Mr. Wishon, while recognizing the vast value of general publicity in the past, to meet present-day needs advocates a very definite campaign of education among all the individuals and concerns which utilize, or ought to utilize, electrical energy. His progressive plan involves the preparation of actual figures, in dollars and cents, showing how new hydroelectric development will help each element in the community—the farmer, lumberman, architect, manufacturer, and so on, through all the system of modern industry. Even a maker of overalls, to whom he communicated his ideas, proved with paper and pencil how he could sell 1000 dozen pairs of overalls in addition to his present sales within a certain San Joaquin Valley territory, if proposed hydroelectric development were carried through. The entire network of business affairs is immensely benefited by such new projects; and what Mr. Wishon proposes now is to show each element just how much it is directly benefited, so that it will clamor for the production of greater hydroelectric power in the West.

Once more, through the forward-looking thought of one of its industrial leaders, the West is pointing the way toward a notable advance — a progression from the general to the specific in publicity, with a common-sense appeal to the pocketbook.

New Journal Service

PLANS FOR THE COMING MONTH INCLUDE

OCTOBER 15.....Special Salesman's Issue

Beginning the "Public Policy" series by S. M. Kennedy. Also articles covering every aspect of the salesman's problem.

NOVEMBER 1.....Pan-Pacific Issue

We are so proud of this number of the Journal of Electricity that we are sending it to every corner of the Pan-Pacific field, beyond even our regular circulation list.

WATCH FOR

BOOKKEEPING FOR THE ELECTRICAL STORE
by J. H. Walker

CONTRACTING PRACTICE
by Louis Etshokin

A COMMON COMMERCIAL LANGUAGE
by W. R. Daingerfield

THE NEW PHYSICS
by A. C. Crehore

Just Jones Starts an Electrical Store

BY J. H. MOSELEY

(Originality as a business asset for the electrical contractor-dealer is the keynote of this intimate sketch of the successful sales career of "Just Jones." The author, J. H. Moseley, formerly with the advertising department of the Western Electric Company, is now with the American International Corporation, export organization, as New York manager of the G. Amsinck & Company of Mexico. Mr. Moseley's progressive ideas on merchandising call for close consideration.—The Editor.)

TODAY, I, John Jones, a contractor, who am a practical electrician, and who, during my lifetime, have done some little work connected with retail selling, have decided to open up a store in a town in California. I am not only going to go after the wiring and fixture business, but I am going to make a try for industrial business and especially am going after the big volume of household appliance business, which is growing every day by leaps and bounds.

How shall I start? How am I to begin with a small capital and build up a good-sized business, through advertising?

Jones Selects the Best Location

Since I must have a place of business, the first consideration is the location of my retail store. The two factors involved are (1) rent, and (2) accessibility.

I shall pay as much rent as I can afford, based on a certain estimated volume of business. Having determined my maximum rent figure, I shall pick out the most accessible location I can secure for this amount of money.

In choosing a location it is a good idea to take a plot of the town, regardless of the size, and determine on which side or in which portion of this town are the greatest number of prospective customers. Furthermore, which side of the town is most likely to grow fastest.

Having decided this, the question of location is half solved. The problem can be limited still further by dividing that half of the town selected into two parts. This will give a small sector of the business portion in which I shall try to locate. In what part of this section shall I try to secure a place? If my rent allows, I shall select a place near a moving picture show, a successful confectionery store, or any other prominent concern which advertises liberally.

A location near a moving picture show is good on account of the ability to make night window displays to a good audience.

Let's assume I have secured a location near a moving picture show. The next question is, what shall I call myself and how should I make my store stand out as the most prominent one on the block?

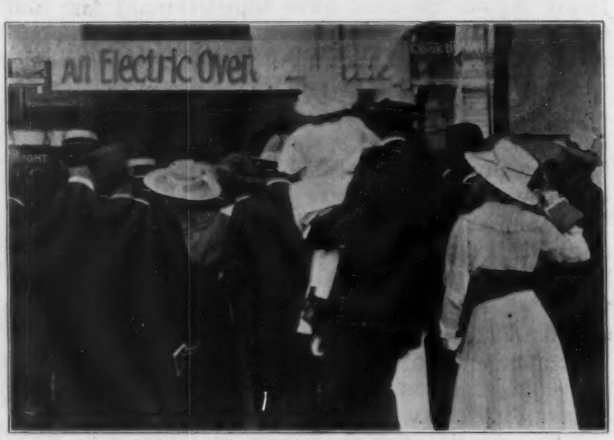
Jones is a plain name, so suppose I decide to have my firm name "Just Jones." This can be interpreted in two ways; first, as meaning just ordinary, plain Jones; and second, as meaning "Just" Jones, giving the idea that I am absolutely just in all my dealings. It would be different from the ordinary name of "Jones Electrical Company" and would have an individuality to it.

Now, the chances are that my neighbors in a town of the size mentioned would have rather elaborately decorated window signs, consequently in order to get contrast, suppose I simply letter **"Just Jones"** in two or three-inch gold letters on the window glass either side of my door, paint the store front a prominent color to contrast with the others in the block and have made up a neat electrically-lighted sign with the name **"Just Jones"** on it.

I will, of course, want to use the same name on my envelopes, letterheads and billheads; and by all means these should be printed in the same kind of type as that used on the show window and electric sign.

I am now ready to open my store and put my wares before the public.

The ordinary merchant would probably insert a full page ad in the newspaper and possibly send out



A good location is all-important. If nobody passes your store you can't draw a crowd. Having secured the location, fix up a window display that will make everyone late for work.

circular letters to a selected list of friends. Consequently, in order to be individual, I shall secure some special yellow envelopes with my imprint thereon, these envelopes to resemble as much as possible the ordinary telegraph envelope. The inserted message might have the same heading, and read like a telegram.

In the lower left-hand corner on the message sheet should appear a small illustration showing a plot of several blocks of the town, with an arrow pointing to Jones' location.

If this message is printed in the same manner in two or three issues of the local paper, the chances are that the combined publicity will result in quite a few people visiting my store during the opening week. From these visitors a considerable number of leads should be obtained, to be followed up later by a salesman.

The Daily Drive for Business

I have now opened my store and am ready to start a hard every-day drive for business.

Here are the kinds of business I am going after:

1. Home wiring and fixtures.
2. Commercial wiring and fixtures.
3. Industrial wiring and motors.
4. Lamps.
5. Household appliances.

Home Wiring and Fixtures.—Where does this class of business originate? There are two classes of buildings on which to work:

1. New buildings.
2. Existing buildings.

Contracts with new homes can be made best through:

The Real Estate Man,
The Architect,
The Contractor and Builder,
The City Building Permit Records.

Now, where shall I start in order to get this business?

His House in Order—Electrically

Without a question the first place to start is at my own home. My home should have everything in the way of modern wiring and fixtures, so that I can actually show prospective customers the utility of having receptacles in the proper places, and the decorative effect of having the right kind of fixtures.

If, through force of circumstances and lack of capital, I cannot equip my home in this manner to start with, then I shall pick out several prominent homes in the city and work very hard on them until they are equipped in a proper manner. I then shall have examples through which to sell my other customers.

The best kind of advertising, and that which makes the greatest impression, is the citation of particular and specific facts. For example, when I have finished up a particularly nice job of house wiring and fixture installation, here is a chance to send a circular letter to my entire mailing list of real estate men, architects, builders, etc., calling attention to the fact that the house in question has just been wired and illuminated by me and suggesting that they go around and see it at the first opportunity.

Existing homes which offer prospect of new fixture installations and changes in wiring can gradually be listed for use in the manner suggested above.

Another opportunity of keeping in contact with such prospects is to send them a short letter, notifying them of the receipt of new fixtures, attaching if possible a circular illustrating the fixture in question.

Almost everybody is glad to keep pace with the times and will appreciate attention. Such letters may not result in actual orders at the time, but eventually they are going to have the desired effect. I will not send out a letter unless I have something to say. This is a simple rule which if followed will surely bring success.

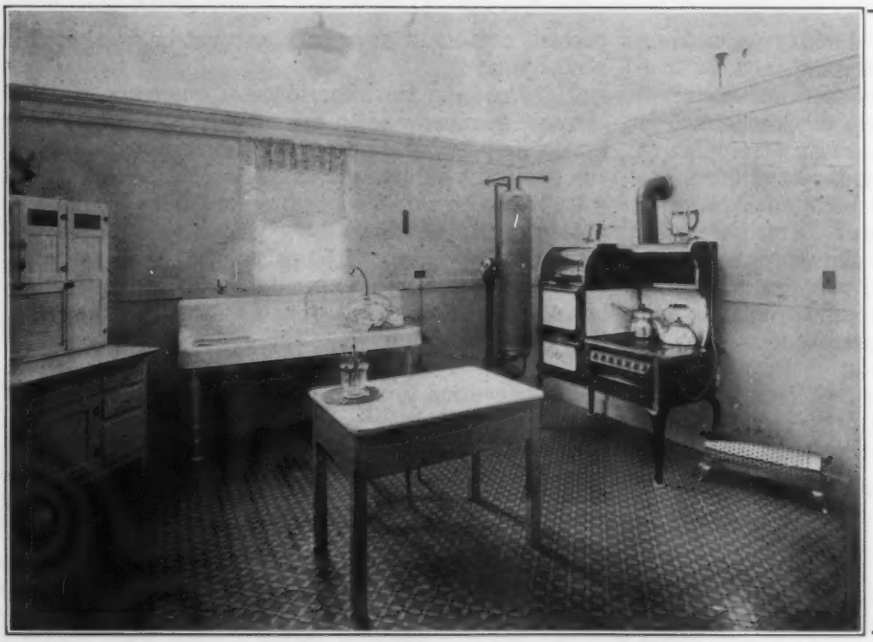
Commercial Wiring and Fixtures Next

Where shall I start on my commercial wiring and fixture business?

Once more it is necessary to have an example to start with, and my own store is the best example I can have.

It might be a good idea to design the fixture plan of my own store so that it can be changed occasionally, looking new and up-to-date at all times.

It will be easy to build up a mailing list of all the stores in town needing re-designed fixture in-



Advertising, like charity, should begin at home. You can't expect to convince your customers that they need electrical kitchens if your wife cooks on a coal stove. The modern equipment in your home should be such that your friends will talk about it.

stallations. Here again the mailing list will come into use every time I re-design the fixture installation in any store, or wire a new store.

When I fix a new show window for some one, I shall work to get as attractive a display as possible, and it might be advisable in such cases to actually check up the number of people passing and the number who look in, using this data in a letter to other prospects.

Following Up Industrial Prospects

Prospects for industrial wiring and motors can also be built up into a mailing list. This mailing list can be utilized in a manner similar to the other mailing lists noted above. While such a list may not contain, for a small town, more than 10 to 50 names, nevertheless it will be worth while to have it.

The best way to start this business successfully is to start a service system for taking care of the motors already installed in the neighborhood. This might be called "Just Jones Motor Service," and would consist of the cleaning and oiling of all motors of a customer once a month for a stipulated sum.

This sum must be set for each customer and should be sufficient to cover the cost of doing the work, the cost of the oil, and a small profit.

I will find that the leads obtained from a service of this kind will be of great value, because by monthly contact I am sure to know when a man is contemplating the installation of an additional equipment.

In making my bid on this equipment I can well afford to include service for a period of six months or a year. This would be a strong factor in fighting competition.

The moving picture shows perhaps lead most businesses in the way of exterior illumination, consequently here is a place to start for lamp business.

Other stores having electric signs are also good prospects, and this business should be built up on a service basis entirely.

Just Jones Signs Up the Customer

My desire is to get my customers to sign up with me for lamp service for six months or a year at a time. During this period I shall make it a point to look at their electric signs at least two or three times a week and their lamp stock at least once a month.

I shall work out a minimum stock which each customer should keep on hand and as my man makes his monthly rounds let him make note of the requirements in order to fill up this stock to the required amount.

I find that this will build up business and will be giving my customers a service which they will certainly appreciate.

The selling of electric household appliances will need my most careful attention and study. I shall plan out a definite sales campaign, with a regard for local conditions and the needs of the community.

Always my purpose shall be to accomplish things in an original and effective manner—to gain and to hold the favorable attention of the buying public.

Developing New Business

BY W. S. BYRNE

(The increased cost of production consequent upon higher wages and higher price of materials has concentrated attention upon ways and means of meeting the situation. The negative method of directly reducing expenses as far as possible has many adherents, but the sales manager of the Nebraska Power Company, Omaha, favors concentration upon new business as more effective in the long run. This paper was presented at the recent N. E. L. A. Section Convention at Grand Island, Nebraska.—The Editor.)

We find ourselves confronted today by a problem which becomes increasingly difficult as time passes. Construction, reconstruction and development expenses mount apace while our economies in manufacture have apparently reached that point at which little improvement can be expected from the introduction of any new methods of manufacture or increased efficiency of apparatus. Our rates of return, too, in the vast majority of instances remain as in the pre-war period. But we must progress, and we have before us but one means of meeting the exigencies of the situation—new business.

Solving the Problem of Increased Cost of Production —

We must secure an increase of volume which will reduce in proportion the cost of production and operation. We must make two kilowatts grow where but one was before. New sources of outlet and income must be found, and when I say "new" I do not necessarily mean only new purchases, but increased use by existing customers as well. Probably in many instances, new products must be marketed or our present commodities or service must be marketed in a new way.

It has been the experience of our company that the sale of merchandise can quickly be made, with a little intensive effort, 15% of the former income to the property. Putting this statement in a different way, it can be said that the merchandise business of a community of about 200,000 can very readily be made approximately $1.50 per capita. In small communities, the income per capita should be correspondingly higher as a result of more direct contact with the purchasing public. This is not a matter of theory—it is exact fact brought out through analysis of our operation in small and large communities.

The public, however, can only be sold after your organization is sold. Acting on this principle, we were able in the month of March, this year, to show an increase of 72% over the preceding month, and a 12% increase in April over March.

Selling the Organization —

This condition is being maintained and is no sporadic peak. It is the healthy condition of our

business and market. These facts are proof of the truth of certain principles. First, irrespective of selling price and discount to the dealer, there must be selected types of appliances to be sold in which you have confidence and on which you are willing to stake the good name of your organization. Select that washing machine and vacuum cleaner which will unquestionably give service to the user and can be known in your community as the best device of its kind sold.

Second, secure from the manufacturer of these appliances the services of one of their factory experts who not only knows the quality and workmanship of the device in question, but who can bring the story home to your sales force, your repair force and in fact, your entire organization. Convince them that this is the appliance they should use in their own home and make it attractive for them to use it. Derogatory comment by a repair man can un-sell more appliances in one hour than your sales force can put out in a month.

Third, be prepared to give service on these appliances which is expert and rapid.

Fourth, demonstrate these appliances to the user until she or he is unquestionably versed in their proper use.

Fifth, bear in mind the fact that if you have not been merchandising in a broad way, it is necessary to overcome the fly-wheel effect of your organization against the progress of merchandising, and you must offer at least initially to the public, and to your organization, inducements which will convince them of the necessity of purchasing or selling these appliances.

Conducting a Campaign —

When I say, offer an inducement to the public, I do not have in mind promiscuous price-cutting. The successful and profitable policy is to sell at list prices, but since we are not essentially merchants, we can well afford to study the methods of the department store merchant in the same way in which you would expect him to study your methods in the manufacture of electrical energy.

In the opening campaign, you will find that it will probably be necessary to offer some nominal cut in price on some device or an improvement in payment terms, and some monetary inducement to your entire force to stimulate sales.

"Nothing succeeds like success." Carefully select the device for your first campaign. Plan the campaign, its advertising and the details of its conduct in such a way as to secure big results. This having been accomplished, the pioneering is over. Now keep eternally at campaigning.

Increasing Prices —

On one particular device, we found it necessary to increase our selling price as a result of the termination of a pre-war contract.

Before putting into effect this increase in price, we advertised and made it known through our organization, that due to this condition, it would be necessary for us to increase the price of this device on a certain date. As a result of this statement and our advertising, our sales in this particular line increased about 25% over previous sales. Following the change in price, and for the purpose of instilling confidence in our organization as well as putting over the new price, we conducted a two weeks campaign at the increased price but made a reduction in the monthly payments when sold on the deferred payment plan. These new terms were advertised, the sales force went out with renewed vigor, and in spite of the increased price which was over 12%, we were able to increase our sales during the two weeks campaign to a point where they exceeded the sales of the former campaign by about 50%.

Deferred Payments —

Another fact which may be of interest and which our experience has brought out, is that the public generally is satisfied to pay an additional price or carrying charge for purchases on deferred payments. We are making a difference of from 7½% to 12% in the selling price of our appliances sold on the time payment plan.

Persons who wish to purchase on this basis are reconciled to that fact. They generally realize that the protection is due you, and the unqualified statement may be made that the cost of carrying these accounts can be charged to the purchaser in this way and meet with his approval.

Limiting Home Demonstrations —

If you are selling a device which you know will give satisfaction and in which your sales organization has confidence, it is unnecessary at this stage of the public's familiarity with the appliance, to demonstrate it in the home before purchase.

During the months of March and April, we were able to save $1,200 expense incident to the delivery and damage of washing machines and vacuum cleaners resulting from permitting them to be used in the home, by insisting that with our guarantee we knew that if the prospective customer was interested in the purchase of a given device, he could afford to make the initial payment or buy the machine outright before having it delivered to his home for use.

Explaining to the Customer —

Now as to the matter of new business resulting from the increase in the sale of our service. Many of the factors that caused us concern in our industry are pinching the toes of our prospective customer, and we may as a result secure audiences and consideration where the prospect has heretofore been adamant.

It is a generally accepted fact that even where increases in rates have been secured, the increase has not been in direct proportion to the increases in manufacturing expense. This fact, your local miller, elevator man or pumping station, may not realize. It is certainly most timely that new proposals and new estimates of the customer's present expense should be brought to his attention.

Growing Opportunities —

Business generally is in the most prosperous condition it has known for years. Men are more concerned in their operating conditions and are more cunning in their efforts to effect economies than ever before. In the vast majority of cases petty preju-

dices and former apparent high costs can be set aside through the active solicitation of power business, particularly. You are warranted in redoubling your efforts, and judging from the experience of numerous central stations, your success is practically assured.

Mercantile institutions are presenting their wares, and are operating their establishments in a way hitherto unthought of. Lighting is one of their best invitations for the customer to purchase. Let us cash in on this condition. We build not for today. The saturation point is a thing unheard of to the consumer. Let us, therefore, make known our wares, apply our fullest energies, and reap the harvest at hand.

Western Ideas

SERVICE ABSOLUTELY is a slogan adopted by a Salt Lake City electric supply company, and carried out even to the point of answering a complaint call before one connected with new business or a sale. But the reward is reaped in the absolute

Cards used by the Walker Electric Supply Company of Salt Lake City, illustrating the principle of courtesy to customers in even the smallest matters.

confidence of customers and in the company's reputation of living up to its slogan, and the results are of distinct financial advantage, aside from their other aspects. The slogan covers everything that goes out of the store, even repair work on equipment not originally purchased there.

The same company makes use of a small calling card which is left in case a customer is not at home. This courtesy prevents misunderstandings, or a belief on the part of the customer that the company has neglected his call.

STUNT ADVERTISING is one of the most elastic and most effective of publicity methods for the retailer. We quote the following interesting and successful devices from "Western Advertising":

"A cigar dealer in Harrisburg arranged an exhaust from the motor of his delivery automobile so that it reaches the tip of a huge cigar mounted on the roof. As the wagon goes about the city, the smoking cigar not only attracts attention, but indelibly impresses the name of the dealer upon all who see it.

An ice company solved the problem of proving the value of their ice by freezing a clock inside of a large cake of ice. This was then placed on the sidewalk with a sign reading: "See how long it takes our ice to melt."

A bank in the Middle West tried the experiment of placing a full-blooded cow on exhibition in the lobby, and 276 new accounts — the majority from farmers—were opened in a single day.

A clothing company in Indianapolis, Ind., secured fifty homing pigeons, attached to each one a tag entitling the finder to a suit of clothes, and then gave publicity to the project by widespread newspaper advertising. The result was an increase in sales which more than offset the cost of the pigeons and the suits which were given away.

Capitalizing the idea that crowds are always interested in action, the Moe Levy Company of New York makes it a point to change its window displays during the noon hour when the greatest number of people are on the streets. The window trimmer "carelessly" knocks over a figure and this in itself is sufficient to attract the crowd. After the display has been put in place, the manager comes outside, peers through the glass, and directs that certain changes be made. The crowd often takes such an interest in the proceedings that it will volunteer instructions as to the arrangements of the display."

TWENTY SERIOUS RETAIL LEAKS through which profits escape are listed by a retail specialist as follows:

Over-measurement of goods; reckless cutting of samples; nonavoidance of remnants; slothful care of stock; careless packing; improvident purchase and use of supplies; discarding empty cartons; shopworn goods through lack of suitable fixtures; poor arrangement of stores; extravagant illumination; pilfering of goods and money by employes; losses through incompetent window trimming; employing incompetent help; dissatisfied customers; carrying dead stock; poor buying; excessive alteration extras; poor advertising; poor bookkeeping, and passing discounts.

Probably no electrical retail business is suffering from all the twenty leaks, but most establishments can find two or three. Why not stop them up?

SENDING MAZDA LAMPS BY MAIL and adding the charge to the next bill for current is a convenience recently initiated by the Duquesne Light Company, Pittsburgh. The postal authorities will not insure the lamps, on the ground that they are too fragile, but the use of a special corrugated box package reduces breakage to a minimum, and the company undertakes to replace any lamps found defective if they are tested on receipt.

A telephone call or postal card to the electric shop of the company brings by return mail as many lamps as the customer may require.

MORE LAMPS ARE USED by people who have a case of spare lamps handy than by those who are accustomed to buy only two or three at a time. For this reason one electrical salesman has cultivated the habit of signing lamp contracts with small stores and factories for their yearly supply, instead of confining his attention solely to large lamp contracts.

A store which has an extra case of lamps on the premises will tend not to have empty sockets, whereas the custom of buying two or three lamps at a time induces postponement in the replacement of old or broken lamps.

The signing of lamp contracts with small stores brings in orders for cases of lamps and the owners of these do not make shift for an indefinite period with worn-out lamps and empty sockets. The result is an appreciable increase in lamp sales.

A CONVENTION IDEA which proved efficient and handy was the ticket book arranged by the American Society of Mechanical Engineers for its spring meeting. The book, which was about 4½ by 2½ inches, contained duplicate detachable tickets for every event of the convention. On the cover was an announcement to the effect that it was necessary for the visitor to have the book of tickets with him each day, and to register for each event at the time of receiving the book. In this way those in charge were able to keep track of the number to be expected at every event.

INCREASING THE SENSE OF RESPONSIBILITY of the individual citizen and making him understand that he, and not a vague impersonal municipal government, is called upon to maintain the standards of the city, is no simple task. The average man is all too prone to forget that he is a unit in a community, and a power for progress or stagnation. The following Code for Civic Betterment was issued through the Denver schools in order to bring the idea home in a direct, personal way to parents:

A Code for Civic Betterment

I volunteer to become a member of the Civic Betterment Movement, and will help to keep Denver a clean, beautiful and law-abiding city. I will assist in the following ways:

1 I will keep my premises clean and cooperate with my neighbors, in keeping the street directly in front and the alley in the rear, free from GLASS, paper, lawn-cuttings and litter.
2 I will endeavor to keep my premises free from DANDELIONS.
3 I will place a box or barrel for all tin cans and broken glass.
4 I will use a garbage can, with cover. I will keep garbage free from glass or anything that would be hurtful to hogs.
5 I will not use a vacant lot as a dumping ground.
6 I will not throw the rind or peel of oranges, bananas, apples, or other fruit on the sidewalk or in the street.
7 I will protect public property and encourage others to do the same. I will not waste the city water.
8 I will aid in preventing fires by keeping my attic, basement and yard free from rubbish, greasy rags, and waste paper; by being careful in the use of matches and explosives; by having chimneys and furnaces inspected and cleaned regularly; by keeping ash pit covered; by burning all waste paper in ash pit and never in furnaces, stoves or on vacant lots.
9 I will aid in any way I can to exterminate the house fly.
10 I regard it as a duty to plant a garden, if possible, and to encourage the garden work of our public schools and the cultivation of our city vacant lots.
11 I will observe our city ordinances relative to sanitation, fire prevention and care of public property, and help in securing other ordinances should the need arise.
12 It is my duty to have a reverence for the law, and show respect to our executives, city, state and nation.

Committee for Civic Betterment
Denver Civic and Commercial Association.

Affixed to the code is a detachable stub bearing the words, "I will gladly cooperate by carrying out to the best of my ability the Code for Civic Betterment," together with spaces for the signatures of parents and children, the address and the school district, with instructions to return the stub to the school.

MIRRORS IN YOUR SHOW WINDOW are a very effective device, but they should be placed with great care, or they will do more harm than good. The unprincipled public has an incurable tendency to use them for putting its hat straight, or seeing whether its shoes are run down at the heel. If you have mirrors in your window, arrange them so that they reflect your stock and not the street. It is all very well to be accommodating, but window displays have a purpose. Do not defeat the purpose by tempting the public to regard them merely as inconvenient obstructions to a handy mirror.

The Cleveland Trust Company has offered for the use of Cleveland firms the space adjoining its main building. The public has taken so keen an interest in these demonstrations that the spot has been named "Cleveland's Most Interesting Corner." This picture shows an exhibit by The Van Dorn Electric Tool Company of their portable electric drills.

The exhibit included a display of all the parts ready for assembly, each marked to indicate its particular function.

Two workmen were engaged to demonstrate, drilling large and small holes in plates of various thicknesses.

Effective House-Wiring Publicity

BY WILLIAM BLISS STODDARD

(Publicity is well termed "the light of directed attention." This article, by an electrical merchandising specialist, shows how to turn the light onto LIGHTING. The concrete examples here given, telling how leaders in this line have promoted popular interest in modern house wiring, will indicate methods by which other contractors and dealers can gain profit-paying publicity.—The Editor.)

Now that the days are getting shorter and more time must be spent under artificial light, it should be the aim of every householder to have the best light possible—and of course this is electricity. Accordingly, the electrical contractors and dealers should see to it that their "lines" are given the widest possible publicity ere winter sets in.

One of the most effective campaigns along this plan is being conducted by the Sterling Electric Com-

In the window of the Hatfield Electric Company, Indianapolis, Ind., was displayed an electric washing machine which had been run for a time "equaling more than 34 years of actual washing use." It proved a most forceful advertisement of the excellence and economy of this household utility.

pany, Minneapolis, Minnesota. They began by running a series of ads in the papers, one of which declared:

THE GREATEST SERVANT IN THE WORLD lurks in every electric light socket in your home. Why not let this ever-ready, tireless, electrical genius drive away drudgery from your home. Once your home is wired you have the benefit of the vacuum cleaner, washing machine, irons, hair curlers, hair dryers, percolators, toasters, chafing dishes, sewing machines — all run by electricity.

Any and all of these conveniences may be secured on easy payments if desired — and you have their benefit while paying for them.

They followed this up with a series of cards in the street cars:

Wire us, and we will wire you. 'Phone Blank 3010.

Yes, we do electric wiring — and our prices are right.

Don't be like the Arkansas man who said, "On a rainy day you can't mend the roof, and on a fine day it doesn't leak."

Take time by the forelock, and let us wire your house before the rainy, disagreeable November weather sets in.

Perhaps their most effective agent, however, was their show window, which was hung with curtains of wine color. Against them stood the half-length figure of a man, with a card: **"Electrify your Home NOW,"** and pointing to a large card on which was the picture of a suburban home, with little red ribbons running from each room to twelve white cards above and below, each of which described the equipment for that room, and the conveniences that could be placed therein. For example, on the card describing the Den was printed: "For Your Den, two wall or baseboard outlets for the use of reading lamp, bracket lamp, cigar lighter, chafing dish, fan, percolator, tea samovar, grill, toaster, vibrator, and radiator." In large red letters at the top of the card was printed: **"Comfort Possibilities,"** and at the bottom, **"Do It Electrically."** The cardboard figure and the big sign were set on a base draped with green velvet, and against it leaned coils of wire, while on the floor were sockets, batteries, screws, casings, and other wiring supplies.

The office of the Pacific Gas & Electric Company, Redwood City, California, has been waging an electric wiring campaign, their advertisement being decidedly timely and practical:

BURGLARS WILL NOT VISIT HOMES WHERE ELECTRIC LIGHTS ARE BURNING

Recently the home of a prominent citizen of a near-by city was burglarized three times within a short space of time. The burglar was arrested, and the owner determined to learn, if possible, the cause of this unusual series of robberies.

"It was the only house on the street that was dark," said the burglar. "Take a tip from me. If you don't want burglars, keep some electric lights burning at night."

New wiring devices make it possible to flash on every light in your house and garage, from a switch beside your bed. What better burglar insurance and protection can you carry? When you go into your garage at night you can press a switch in your house and all the garage lights go on. When you return later with your car, press a switch in the garage and all the lights in the house flash on.

Ask your electrical contractor or dealer to show you how these wonderful new devices operate.

From the manufacturers they secured a quantity of cards quoting the price of mazda lamps of every size and for every purpose, and on the reverse side they printed:

FOR FIVE CENTS

THE PRICE OF A STREET CAR JOURNEY

YOU CAN light an average room with mazda lamps three hours a night for six nights.

Expert advice on residence, store and shop lighting will be cheerfully furnished by specialists on application to us.

This show window of the Sterling Electric Company, Minneapolis, Minn., makes an ingenious presentation of electric "Comfort Possibilities" in the home. Note the arrangement of the coils of wire.

From generalization to specialization was the step taken by the Hatfield Electric Company, Indianapolis, Indiana, who called attention to the convenience of the electric washing machine:

STOP! LOOK! AND LOOSEN!

An electric washer is not a useless extravagance —it is an an investment that effects a very appreciable yearly saving.

Your clothes last from three to five times as long; your wash DAY is turned into wash HOUR; and best of all, the little old machine runs right along year after year—it is built to last a lifetime.

As in the case of a number of other electrical concerns, they offered to give a free demonstration of the machine at the home of the prospective purchaser. The window that they used to supplement their newspaper advertising was one of the most practical demonstrations of the usefulness and long service of the washing machine that could be imagined. In the center foreground was shown an electric washing machine, busily churning the suds, and a large card beside it called attention to the fact that:

THIS ELECTRIC WASHING MACHINE

has run at least six hours per day for the past three years. This equals more than 34 years of actual washing use, at a cost of less than five cents an hour. It is operated by a worm gear, which is one reason why the machine does not wear out.

The machine was seen to be in excellent condition, and since seeing is believing, the durability of the machine was at once impressed upon the mind of all beholders. At the extreme end of the window was a life-size cut-out of a woman using an actual electric iron.

PENSIONING EMPLOYES

(Among outstanding examples of the growing co-operation between employers and employed is the large-scale plan of pensions and disability benefits newly instituted by the Southern California Edison Company and briefly outlined here.—The Editor.)

To every employe of the Edison System, who by long and faithful service becomes entitled to receive it, a generous retiring pension has been provided. To employes who have qualified by service, a disability benefit may be granted, should physical misfortune befall, in later life, before the retiring age and period of service has been attained.

In the plan for pensioning retired employes, and providing for those disabled, the management of the company has devised one of the broadest and most comprehensive systems of equitable provision for age that has thus far been achieved. It has no taint of charity; nothing to compromise self respect or independence, but is made a right of contract; a part of the employe's expectancy for the period of life when to most persons the necessity of an income is the greatest.

Pensions and disability annuity added to other things make the service attractive, and assure to those entering it the opportunity to develop individuality and initiative, to accumulate property, and to work to the best of their ability in one of the newest and greatest industries of the age. There is opportunity to purchase stock in the company; medical and hospital care in case of illness; business and technical educational opportunities provided to qualify them for advancement; and the desire on the part of those in authority that every individual in the organization shall measure up to full capacity. And now comes the assurance of provision in case of disability and a competency in age.

The contract conceived by President W. A. Brackenridge, and approved by the board of directors and ratified by the Railroad Commission of the state, establishes the principle of pension compensation as a matter of contract and assures the employe who fulfills the reasonable obligations of the service that it will be paid when the time of retirement arrives as a matter of right and is collectible by law. A contract will be duly executed and delivered to each permanent employe of the company.

The chief features of the contract, with an interpretation of the reasons for their adoption, are in substance as follows: Not only the employes of the Southern California Edison Company, but those of all of the subsidiary companies, are included in the plan, thus there is no discrimination against any of the men or women who have come into the Edison family. The other corporations, each of which pay to the pension the pro-rata of the time employes have been in their service, are the Mt. Whitney Power and Electric Company, the Santa Barbara Gas and Electric Company, the Santa Barbara and Suburban Railway Company, the San Joaquin and Eastern Railroad Company, and the Huntington Lake Hotel Company.

Male employes reach the age of retirement at sixty years, female at fifty-five, when they have been in the continuous service of the Edison Company or

any of its subsidiary companies for twenty years immediately preceding retirement.

The following scale applies to those who can be retired before serving twenty years: men sixty-one, women fifty-six, who have served continuously nineteen years; men sixty-two, women fifty-seven in service eighteen years; men sixty-three, women fifty-eight, service seventeen years; men sixty-four, women fifty-nine, service sixteen years; men sixty-five, women sixty, service fifteen years.

The monthly pension allowance is based upon the average monthly compensation the employe received during the five years period of employment when the compensation was the greatest, computed in this manner:

Two per cent of the first $200 monthly compensation, one and one-half per cent of the next $300, one per cent of the next $500, three-fourths per cent of the next $1000, and one-half per cent of all such average monthly salary above $2,000. The figure or sum thus determined is multiplied by the number of years of service immediately preceding retirement, and the sum thus determined shall be paid the retired employe until death. No payment, however, shall be less than $25.00 per month.

A disability benefit is provided for employes who have been in the service twenty years, and who become disabled in any manner, upon the recommendation of the Pension Committee, approved by the President and the Board of Directors, or the Finance Committee. There is also a clause giving the management some latitude to grant disability benefits to those disabled who have not served the full twenty years.

The period over which the disability benefit shall extend is to be determined and fixed by the Pension Committee and all of the terms and conditions of the disability benefit may be changed from time to time in the discretion of the committee, with the approval of the President and the Board of Directors or the Finance Committee, but in no case shall the disability benefit exceed fifty per cent of the salary, at the time the benefit is granted. The disability benefit, however, is not like the pension, and does not become a liability of the company.

To ascertain the amount of the pension to which an employe would be entitled at the end of twenty years, or from fifteen to nineteen years, if he is in the older class, the following example shows the methods of computation:

John Smith, an employe, reaches the age of sixty years after twenty-three years of service and is retired on pension. His average pay for the highest five years of service was $180.00 per month. Two per cent of $180.00 is $3.60, which multiplied by the twenty-three years of service gives him a retiring pension of $82.80 per month.

The Salesmen's Auxiliary

BY HOWARD ANGUS

(The work of the California Electrical Cooperative Campaign no longer needs any introduction. The newest scheme of this enterprising organization and the practical working out of the plan are here described in full by the Secretary of the Cooperative Campaign.—The Editor.)

The Salesmen's Auxiliary is now organized and at work under the supervision of the Advisory Committee of the California Electrical Cooperative Campaign and is actually showing the electrical dealers how to improve their businesses and better serve the public in conjunction with the Campaign's Field Representatives.

The question—What is the Salesmen's Auxiliary?—can be best answered by answering three other questions.

1. Why is the Salesmen's Auxiliary?
2. What is its work?
3. Who make up the Salesmen's Auxiliary?

A Definite Need —

Before any organization is attempted, there must be a definite need for it. The Advisory Committee in carrying its educational campaign to the electrical industry found that California was too large a territory and the electrical dealers too numerous for the work to be carried on intensively and with the maximum results by three men—its Field Representatives. These three men by hard, conscientious effort, have accomplished excellent results in a year and a half, but they presented this difficulty to the Advisory Committee. They said, in substance:

"Our territory is so large that at best we can only cover it four times a year. We are able to show substantial improvements in some instances but not in others. Some men are quick to see an idea and quicker to put a paying plan into operation. Those men we are helping greatly and their businesses are growing by leaps and bounds. There are other men, however, who respond more slowly. We lay out a plan for them. They accept it as good and promise to put it into operation. But on our next trip we find they have failed to act. Instead of being able to give them something new, we have to go over the same ground and plant the same idea again. If our territories were smaller, we could get faster results out of the slow ones. If there was somebody to drop in on the electrical dealers in the interim between our trips and pour a little water on our ideas that they might sprout and grow, the slow ones would improve faster."

Enlisting the Salesmen —

The Advisory Committee knew of no way to shrink the state of California and began looking around for the men who were best able to supplement the Field Representatives' work. Somebody asked, "Why couldn't the salesmen of the manufacturers and jobbers help out?" Somebody suggested, "They are continually visiting the electrical dealers." Another said, "They could help." R. M. Alvord of the Advisory Committee began working on a plan.

The Salesmen's Auxiliary is the result of his thought. This brings us to the question, What is the work of the Salesmen's Auxiliary?

The most important work of the Salesmen's Auxiliary finds expression in actually putting into execution certain ideas which the electrical jobbers of San Francisco and Los Angeles have been expressing in public speeches and private conversations. To sum up these ideas in a sentence: Salesmanship consists in showing the retailer how to sell his merchandise rather than in obtaining more orders from him, because orders will naturally follow if the merchant is able to sell satisfactorily.

Cooperation Pays —

The California Electrical Cooperative Campaign is the organization that has most often voiced these thoughts, and has devised the ways and means of putting them into actual practice. The members of the Salesmen's Auxiliary are, therefore, first of all boosters for that organization, and point out to the merchant why he should put into practice the paying ideas the Campaign's Field Representatives have for his use. When a member of the Salesmen's Auxiliary calls on a dealer he talks to him something like this:

"I saw Jones the other day and he is using the new accounting system that the California Electrical Cooperative Campaign is introducing to the electrical dealers. He is enthusiastic, says that for the first time he really knows his business, knows where the leaks are and how to stop them.

"Smith has remodeled the inside of his store and told me that a field representative gave him the idea. It is resulting in more sales for him.

"Brown has moved into a new location found for him by a field representative and says his business has doubled."

By such talks as this the salesmen call forcibly to the dealer's attention just why it will pay him to adopt the various plans of the California Electrical Cooperative Campaign for improving his business. It is hoped that the Field Representatives will find as a result every dealer anxious for suggestions and ready to put them into operation.

Exchanging Ideas —

The work of the Salesmen's Auxiliary goes farther than that. As its members circulate through the state of California they gather helpful plans and naturally carry them from dealer to dealer as they go. From now on they will be continually improving the business methods of the contractor and dealer.

Each salesman is interested in seeing that his own merchandise, at least, is rightly presented to the public and sold. The Advisory Committee, realizing this natural tendency, have wisely selected for each territory salesmen handling several representative lines of electrical heating appliances and labor-saving and convenience devices. This brings up the question, Who are the members of the Salesmen's Auxiliary?

Personnel of the Organization —

The Salesmen's Auxiliary consists of selected executives and salesmen of the manufacturers and jobbers. At first the thought was to organize all salesmen into helpers, and the Advisory Committee still appeals to all for aid—to those not in the organization as well as to those who are. But further thought convinced the Advisory Committee that the organization would be too unwieldy if it included all; that it would be much better to give responsibility definitely to certain designated men—these men to be responsible for actually carrying to their own organizations the educational ideas of the Campaign and assisting the Field Representatives in their work. Thus the Salesmen's Auxiliary was formed.

Salesmen's Auxiliary Organization

Chairman: M. J. Verdery, Edison Electric Appliance Company, San Francisco.

Secretary: L. J. Brown, Western Electric Company, San Francisco.

Members at Large:

F. J. Airey, Pacific States Electric Co., Los Angeles.
H. W. Allen, Graham-Reynolds Company, Los Angeles.
Clark Baker, National Lamp Works, Oakland.
F. E. Boyd, General Electric Company, San Francisco.
J. O. Case, General Electric Company, Los Angeles.
F. J. Cram, Electric Appliance Company, San Francisco.
J. E. Crilly, National Conduit & Cable Co., San Francisco.
Geo. Curtiss, Electric Ry. & Mfrs. Supply Co., San Francisco.
P. G. Gough, Listenwalter and Gough, Los Angeles.
Ross Hartley, Electric Corporation, Los Angeles.
H. G. Holabird, Holabird Electric Co., San Francisco.
R. A. Holterman, Holabird Electric Co., San Francisco.
H. C. Hopkins, Westinghouse Electric & Manufacturing Company, San Francisco.
J. L. Kline, Western Light & Fixture Co., Los Angeles.
C. D. Lamoree, Westinghouse Electric & Manufacturing Company, Los Angeles.
L. Van Atta, Pacific States Electric Co., San Francisco.
A. B. Vandercock, Western Electric Co., Los Angeles.

SAN FRANCISCO BAY DISTRICT

Territory of Field Representative Curt C. Davis.

Vice-Chairman: H. H. Hoxie, Holabird Electric Company, San Francisco.

District Members:

R. E. Kenyon, General Electric Co., San Francisco.
Oroville Johnson, Western Electric Co., San Francisco.
R. S. Prussia, Westinghouse Lamp Co., San Francisco.
Herbert Rea, Pacific States Electric Co., San Francisco.
H. F. Schultz, Electric Appliance Co., San Francisco.
H. E. Shields, Electric Appliance Co., San Francisco.

CENTRAL DISTRICT

Territory of Field Representative W. F. Brainerd.

Vice-Chairman: C. D. Herbet, Westinghouse Electric & Manufacturing Company, San Francisco.

District Members:

M. S. Barnes, General Electric Company, San Francisco.
W. E. Camp, General Electric Company, San Francisco.
H. D. Harvey, Electric Appliance Co., San Francisco
B. W. MacKie, Western Electric Co., San Francisco.
A. H. Noyes, Electric Appliance Co., San Francisco.
H. A. Sales, Holabird Electric Co., San Francisco.
A. E. Skillicorn, Pacific States Electric Co., San Francisco.

SOUTHERN DISTRICT

Territory of Field Representative A. L. Spring.

Vice-Chairman: D. C. Pence, Illinois Electric Co., Los Angeles.

District Members:

C. T. Carr, Pacific States Electric Co., Los Angeles.
L. E. Darrow, Western Electric Co., Los Angeles.
G. H. P. Dillman, General Electric Co., Los Angeles.
W. R. Edwards, Pacific States Electric Co., Los Angeles.
P. C. Ensley, Graham-Reynolds Electric Co., Los Angeles.
J. H. Jamison, Westinghouse Electric & Manufacturing Company, Los Angeles.
E. L. Nightengale, General Electric Co., Los Angeles.
J. A. Sines, Illinois Electric Co., Los Angeles.
A. A. Smith, Graham-Reynolds Electric Co., Los Angeles.
Harry Summers, Westinghouse Electric & Manufacturing Company, Los Angeles.
C. A. Sunderlin, Western Electric Co., Los Angeles.
Geo. Vedder, Illinois Electric Co., Los Angeles.

The officers and the members at large are executives in manufacturing and jobbing companies. The district members are the salesmen who actually come into direct contact with the contractors and dealers. The duty of the officers is to direct the work of the Campaign. The members at large are to enthuse their organizations with the educational ideas of the California Electrical Cooperative Campaign and make suggestions and criticisms to the Advisory Committee, that the latter's work may be more effective. The state has been divided into three territories corresponding to the three territories of the Campaign's Field Representatives. To each of these territories a vice-chairman and a group of district members have been assigned to supplement the work of the Field Representatives. These district members are actually carrying to the electrical contractor and dealer the ideas of the California Electrical Cooperative Campaign and supplementing the work of the Field Representatives.

Cooperation as a Bankable Asset

BY C. W. BANTA

(The relationship between sales management and finance is a factor to which every business should give special attention, and in which the cooperation of the bank is invaluable. That the bank can and does devote itself to the best interests of its customers, thereby exemplifying the new spirit which is permeating the business world, is shown in this third article on cooperation by the Assistant Cashier of the Wells Fargo Nevada National Bank.—The Editor.)

The treasurer of a certain corporation came to my desk and applied for a loan of some thousands of dollars. I knew the firm, and that they would be good for twice the amount, so I replied that the fund would be forthcoming as required, at the usual rate of interest, for the usual period of time.

He thanked me, and informed me that the sales department had developed a program that would double their business during the coming year.

I asked, "How?"

He replied: "There will be no trouble to sell the goods, we have captured the market. The question is, can we produce sufficient to meet the demand?"

I asked, "What are you going to do with the money you just borrowed?"

"What's the matter, are we not good for it?" he replied.

"Certainly," I said. "You are good for twice the amount, even if you should have a disastrous year and lose all you borrowed. I could, ultimately, make you pay."

"We are going to expand our factory," he said; "the money I borrowed is to go into new machinery. We already have the bids."

"Tell me," said I, "do you really intend to pay back that advance when due?"

"Sure. Are we not good for it?"

"Yes, but that isn't the question. How can you pay it back?"

"Out of the increased income and profits."

"Yes," I said, "that looks easy, but you haven't cash enough to buy that machinery and, if you double your sales, you will have to carry twice your present accounts receivable. Where is the amount coming from? Besides, if you double your business next year, you might have to give a little longer terms or lower your credit department standard."

"You might as well lay out the whole year's program in finance as well as sales," he said.

"Where are you going to get that money to finance these sales?" I asked. "If you want it from the bank you had better negotiate for it now, to be taken and used as you need it."

"I don't think that arrangement is necessary. We know we can get by somehow if we have that machinery. Besides, if you won't give us what we want, another bank has recently offered us three times what we've asked of you."

"Your sales and production program looks all right, but your financial program is not even half baked. Think it over."

I told him several stories to illustrate the point that a bank should not knowingly assist in, or allow a blunder to become an economic loss.

Gold in Its Right Place—

If a young man should come to me to borrow against the collateral of his estate, to squander the money, I should forego the business.

Doctors prescribe that radium in a tube be placed in the patient's throat to assist in the correction of certain dangerous tendencies—but for the patient to deliberately or carelessly swallow the radium would result in an unnecessary loss and would even injure the patient.

Radium is so valuable that even the doctors cannot afford to own it. They rent it by the day.

So it is with the bank. Gold is a drug; when placed in a business where it is both necessary and useful, it has a stimulating effect. But the gold, like the radium, is very valuable. It belongs not to the bank, but to the industrious and thrifty—to the laborers—both kinds,—to those who work with their muscle and to those who use their minds and inspiration to produce new things for the comfort and enjoyment of mankind.

One-Sided Estimates—

Later, the president of the company came in for a talk. I told him that to succeed in his plans, as outlined, would make his company's figures larger, but would reduce its standing from first to second grade. He would not be able to discount his bills and would be up to his chin in debt. We made up an imaginary financial statement to prove it.

The manufacturer went home, called a directors' meeting, and pointed out the flaw in the company's policy. The treasurer stated, at that meeting, that he knew it could be done but that he did not just see how. The heads of all the departments were called into the conference. A survey of the business, as it

stood, as it should be, and as it could be with the new program in force, was immediately taken.

Overhauling a Business —

The purchasing agent was told to inquire and advise the minimum amount that it would take to purchase the machinery—some second-hand—in job lots—or wherever a bargain could be obtained. The stock clerk was to furnish an estimate of the minimum amount of raw material that it would be necessary to keep on hand to supply the new factory's turnover. The collection department was asked for a report of the average number of days that it took the customers who were not discounters to pay. In fact, every department of the business was ransacked for facts. For the first time in years, every executive and department manager jumped to his toes to think—examine—plan—cooperate.

The Results of Investigation —

At a meeting a week later, the results of the thought and discovery were laid on the table.

The purchasing agent had discovered where he could buy the machinery of another concern located at some distance, that had failed, at somewhat less than half of the estimated cost, and at less than half of the amount that they had expected to borrow of the bank. The factory manager found that if necessary he could use one floor less than he had originally intended.

The collection department found that many of their oldest and best customers had fallen into careless methods in settling their bills; in fact, that a number of accounts that should have been closed monthly, had not been balanced for several years. The credit department found that in some cases, old concerns with whom they had done business had gone to seed. The treasurer remarked that the company had become a bank in financing some of the decrepits.

The collection department stated that if the firm would adopt the policy that some of their competitors already had, of requiring that bills be discounted upon the 10th of the month following sales at 2% discount, or that customers wishing longer periods be asked for trade acceptances, 30 days net, the old accounts could be automatically cleaned up and possibly some tens of thousands of dollars be placed at the disposal of the business, rather than idling with these delinquent customers.

The stock clerk's report was the most surprising of all. He found that the company had actually an immense amount of raw materials on hand, in fact, about five months' requirements. They had purchased job lots at close prices wherever offered; the profit that they could take on this merchandise was considerable, because it could be sold at market prices. After a conference, in which market conditions were discussed, they decided to sell, and take their profits on the excess of sixty days requirements.

For once, they beat their competitors to it. Within a month all of the manufacturers in that line of business commenced to feel that the market had reached the high point and that it would be best to limit their supply of raw materials to a few weeks requirements—consequently, the market went down.

Revision of Plans —

The president and the treasurer and the sales manager came to the bank, laid out their revised plans before the officials and were told that the bank would advance them dollar for dollar for the trade acceptances that they might discount, at a lower rate than the current rate of interest, and that the bank would advance them sufficient to discount all their bills, including those incurred in the purchase of the new machinery.

The company had arrived at a well-balanced and well-defined policy. Production balanced sales and finance met both in cooperation.

Efficiency, which is nothing more than common sense, commenced to scare out inertia and half-baked ideas.

An Unbalanced Policy —

I remember a case of a great eastern manufacturing house that engaged the services of one of the highest paid sales executives in this country—in the world, for that matter. The board of directors asked him to present a policy, and he soon presented a program to dominate the field in that particular line. The whole organization became enthusiastic in the anticipation of a great success.

The company had long held an enviable reputation in the trade, and its bankers stated that they would be willing to discount any paper that the company should present.

The credit department of the company adopted a policy, liberal enough to attract the business that might, on an even break, stay with their competitors; terms were stretched to 16 or 18 months; installment contracts appeared.

The obligations of farmers and merchants throughout the country came pouring in and were discounted, and when the banks in that city had enough, the paper was re-discounted in the great money centers. The company doubled the size of its plant and then tripled it.

Then, one day, the load that the financial institutions were carrying on behalf of this concern began to receive attention. The money market tightened. The advances were found to be out of all proportion. The financial situation all over the country became more acute. The farmers paid their more immediate bills and let these long time obligations slip over until the next year. The banks became uneasy as to the value of the securities that they held.

In fact, about a year after the disaster, I sat in the office of the man who had once been the treasurer of that company and who was responsible for its financial policy. He said:

"The most wonderful business opportunity that I have ever seen went wrong because the sales policy of the organization was too heavy for its financial shoulders and because the foundation of the financial policy was not built strong enough to uphold the structure that the sales organization had built."

View from the smoke stack of the Lacombe plant—looking west over the outskirts of Denver to the Rocky Mountains

New Electric Generating Station at Denver

BY H. H. KERR AND T. O. KENNEDY

(A complete description of the equipment and operation of an up-to-date generating station is given in this account of the new Denver plant—one of the most important and interesting of recent electrical developments in the Inter-Mountain region. The authors are construction engineer and general superintendent, respectively, of the Denver Gas & Electric Company. —The Editor.)

The new Lacombe plant of the Denver Gas & Electric Light Company embodies so many new features that a brief description will, perhaps, be of interest.

The rapid growth of the company's business, together with the increased efficiency that could be obtained by concentrating the steam generating capacity in large units in one centrally located plant, led to the decision to build the new station that has recently been completed.

A Desirable Location

The site chosen adjoins the old Lacombe station on the South Platte river and is an ideal location, being practically in the center of load distribution. The only new buildings necessary were a boiler room and a transformer house, since there was ample space available in the existing engine room for the turbine and condenser equipment. Railroad facilities connecting the new plant to the Denver and Inter-Mountain and the Colorado and Southern Railroads were easily obtained and insure adequate service for coal supply and ash removal.

Stream flow records on the river cover a period of five years and indicate sufficient condensing water for 30,000 kw. plant capacity. The river water is not suitable for boiler feed purposes without treatment, and two artesian wells were put down to provide boiler water. One of these wells is pumped by an air lift, the other by means of a motor-driven deep well pump. Both wells discharge into an overhead storage tank 20 feet in diameter and 10 feet high.

Boiler Room Equipment

The boiler room is a concrete, steel and brick building 58 feet by 158 feet, having a 13-ft. basement and 45-ft. headroom above the firing floor. The building is roofed with large gypsum slabs covered with tar paper and gravel. The north and east walls were made permanent of brick and the south and east walls are of temporary construction, being hi-rib steel plastered with a cement gun. This will facilitate future extension to accommodate additional boilers up to a total of eighteen 750-hp. units set singly.

Four 750-hp. Connelly four drum water tube boilers were installed. Each boiler is set singly and covers a floor space of 20 feet by 20 feet. A 15-foot aisle is allowed between adjacent boilers. Working steam pressure is 275 pounds, and it is expected the boilers will operate normally at 200% of rating, being crowded up to 300% on peak loads. The boilers have been set very high and the furnaces are lined with carborundum brick in order to increase the life of the settings and to eliminate clinker trouble. The settings are made air tight by a coating of Crown Plastic Boiler Cement, which is manufactured at the Tar Works of the Denver company. A four-inch thickness of insulating brick in the boiler walls practically eliminates radiation losses. Recording thermometers, draft gauges, steam flow meters and Bailey boiler meters are provided to enable the operators to obtain the most efficient results.

The boilers are fired by Westinghouse underfeed stokers, nine retorts per boiler. Foster superheaters provide 200° F. superheat, which brings the total temperature of the steam up to about 650° F.

Vulcan soot cleaners for operation with superheated steam were installed for keeping the heating surfaces of the boilers free from soot and dust accumulations.

The four stokers are chain driven from a shaft hung on the basement ceiling; the shaft, in turn, is driven by either of two Westinghouse trunk piston engines. Forced draft is provided by two Buffalo blowers, each driven, through gearing, by a Westinghouse turbine.

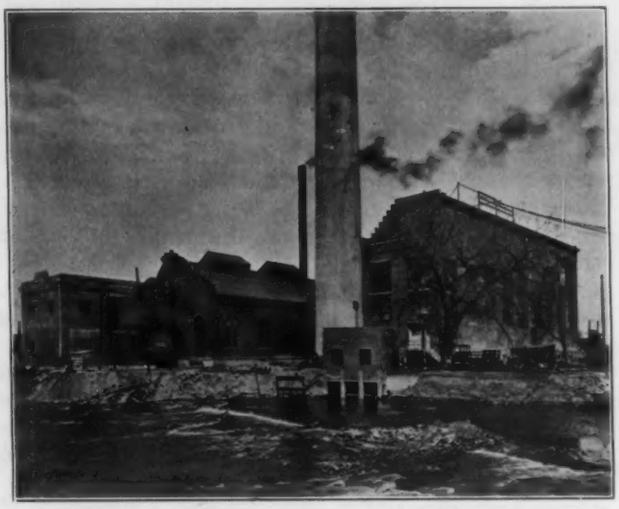
Two Green economizers were installed, each one taking the heat from the flue gases of two boilers and transferring it to the boiler feed water. These economizers are located on a balcony back of the boilers.

Ventilation Arrangements

Fifteen feet headroom is allowed above the boilers and economizers, and this, combined with the fact that a large overhead monitor and sash and large windows were provided, insures plenty of light and ventilation. The space under the economizer

balcony is utilized for flue passages with the exception of one section which is fitted up as a locker room where shower baths, steel lockers and other facilities are provided for the station operators.

A 300-ft. by 12-ft. reinforced concrete stack was erected which will provide sufficient draft to carry



The old station is shown at the left of the smoke stack; the new boiler room on the right. In the foreground is the South Platte river.

normal load through the economizers. This stack, with its six-foot "Doherty Emblems" at the top, has already become one of the well known landmarks of Denver's sky line. The base of the stack, for a height of ten feet, is used for the storage of hot water for boiler feed.

Pumping Units

The boiler feed water is handled by three units each consisting of two Manistee, four stage centrifugal pumps directly connected to a 95-hp. steam turbine. Each unit has a capacity of 300 gallons per minute and is so arranged that the first pump forces the water through the economizers and the second pumps from economizer to boilers. The total head pumped against is 410 feet.

A discarded surface condenser is utilized as a feed water heater, the hot water then passing into the base of the concrete stack from which the pump suction is supplied. The water is metered by a Bailey fluid meter.

Unloading and Storing

For unloading and storing coal a stiff-leg jib crane was installed. The boom swings over a 160-ft. diameter circle and a traveling grab bucket allows coal to be piled 20 feet deep over the entire area. The crane is operated by a motor driven hoist, and is so set that an underwater storage pit can be excavated at any future time without interfering with the crane foundations.

A track hopper has been provided for dumping hopper bottom cars. This hopper can also be served by the crane. A Jeffery single roll coal crusher is installed under the track hopper and feeds an inclined belt conveyor which delivers the crushed coal through a tunnel to the basement of the boiler room where a bucket elevator raises it to a scraper conveyor near the roof. This scraper conveyor delivers the coal to any one of four bunkers above the firing aisle.

Each of the four overhead bunkers has a capacity of 70 tons and will ultimately supply two boilers, one on either side of the firing aisle. Coal to each boiler is measured through a volumetric meter installed in the down spout. The construction of these bunkers is unique, consisting of steel reinforcing bars and expanded metal supported from the building columns and concreted with a cement gun.

A concrete ash pit is provided under each boiler with arrangement for quenching. Each of these pits discharges through three dumping gates into a sluice directly under the pits. Large clinker is broken over a grizzley and all refuse is sluiced into an outside pit within reach of the crane, by means of which it is loaded on railroad cars for disposal. River water for the sluice is provided by a motor driven centrifugal pump.

Generators and Condensers

A 12,500-kw., 4000-volt General Electric turbo-generator was installed and under the excellent operating conditions as regards steam pressure, superheat and vacuum it will carry 15,000 kw. at a very low steam rate. A 100 kw. General Electric turbine-driven exciter provides excitation for the new unit.

The condensing equipment consists of a twin No. 19 Westinghouse Le Blanc jet condenser installed immediately underneath the turbine, which is supported on a reinforced concrete foundation. The auxiliaries of each condenser are driven by geared turbines and in addition one condenser has its auxiliaries directly connected to an induction motor.

An intake and screen house was built on the river bank in which are installed two stationary and

A 12,500-kw. turbine at the Lacombe Generating Station

one revolving, self-cleaning screen. From this screen house the condensing water flows through a concrete tunnel into an open settling basin in the basement of the boiler house. This settling basin is 18 feet wide and extends the full length of the boiler room; the side walls are brought up sufficiently high to prevent overflowing during floods in the river.

The various condensers in the engine room take water from this settling basin through cast iron pipes and all discharge into a common wood stave pipe, which enters the river about 100 feet below the intake. By means of a tile line connecting with this wood stave pipe a small amount of hot water may be discharged above the intake in the winter time to prevent the clogging of the screens by ice.

Switching and Transforming House

Since the main distributing switchboard is at the West Station, it was necessary to provide a

The boiler room under construction. The automatic stokers are fed from overhead storage drums.

heavy tie line between the two stations, which are about one-half mile apart. A 4000-volt, 8000-kw. line was already up and arrangements were made for a 13,200-volt, 8000-kw. line to handle the additional load. This necessitated the construction of a high tension switching and transformer house. This house is of brick 42 feet by 54 feet and two stories in height. Four banks of transformers can be located on the first floor, and all circuit breakers, lightning arresters and switches are on the second floor. Several high tension suburban feeders and the connections to the hydro-electric transmission lines are taken care of in this switch house in addition to the West Station tie line.

Increased Demand for Power

The need for the additional capacity provided by this new plant has been demonstrated by the fact that the electric output of the company for the first three months of 1919 exceeded the output for the same period last year by over thirty per cent.

The cessation of hostilities in Europe immediately produced increased activities in Denver instead of a slump in business, as was experienced in some of the Eastern cities. All indications point to a very great increase in the power requirements.

The design and construction of the plant was under the general supervision of W. J. Barker, vice-president of the Denver Company, and M. R. Bump and R. G. Griswold, of the New York office of Henry L. Doherty and Company. H. H. Kerr was in charge of construction.

RECONSTRUCTING HYDRAULIC UNITS

BY CHAS. H. TALLANT

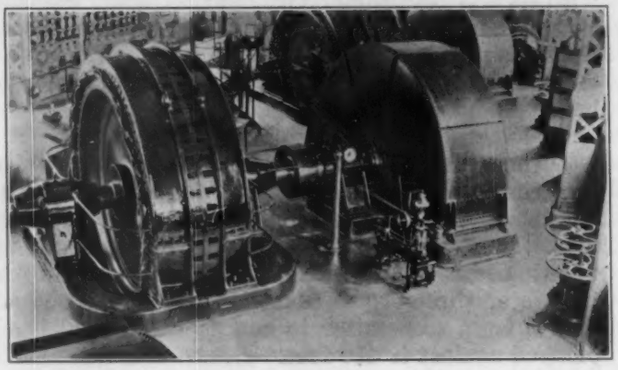
(The increasing of plant equipment and its bearing upon increased output makes continual revision and renewal necessary. How out-of-date hydraulic units, rebuilt to the newest design, are increasing plant capacity to a remarkable extent is described here.—The Editor.)

The rapid advance in improvement in hydraulic impulse turbine design in the past few years has made extensive capacity increases possible in central stations operating old hydroelectric equipment, through reconstruction of the hydraulic units. Impulse turbine units of early design which are still in good operating condition are being rebuilt to deliver an increase in power output as high as 20 per cent in some cases.

The extent and nature of the alterations to the hydraulic units depends on their original design and on the relative conditions under which the units have been and are to be operated. Some units have shown very satisfactory increases simply through the substitution of new buckets, while in other cases complete new runners and nozzle mechanisms have been installed, to effect the desired improvement in efficiency and output.

Obsolete Waterwheels Renewed —

Alive to the possibilities of such reconstruction,



Equipping an old turbine with new buckets and nozzle, and readjusting the runners, has resulted in a highly satisfactory increase in efficiency.

the Pacific Gas & Electric Company of San Francisco has reconstructed several obsolete waterwheels. One of these just completely put back into service is at the plant at Electra, the hydraulic units of which have been rebuilt by the Pelton Water Wheel Company.

The original plant at Electra was erected in 1902 for the old Standard Electric Company, the units having been built at the Union Iron Works, in accordance with the best practice prevailing at that time. The wheels were equipped with twin runners on the same shaft inside a single housing, and each runner was supplied with water separately through individual gate valves and nozzles. The nozzles were of the old deflecting type, without needles. Regulation was accomplished by deflecting the nozzle for variations above half load and by closing one gate valve on the duplicate pair in each unit for variation below half load.

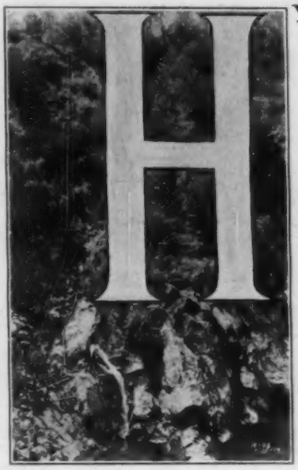
Increased Efficiency —

Reconstruction of the Electra plant was undertaken to provide increased power output with the same water consumption. One complete runner in the unit was discarded and the other, equipped with new high efficiency buckets, was moved along the shaft to mid-position. A Y-nozzle, with needle and sleeve type jet deflector, was connected to the multiple penstocks, replacing the two open type nozzles. Normal regulation is now obtained by manipulation of the needle, with the deflector for use in emergency control.

Operating tests run on the rebuilt units showed extreme smoothness of operation under all loads, and an efficiency increase of 10 per cent, the water consumption being less than before the rebuilding.

A Record in Quick Construction

(The reputation of the West for large hydroelectric developments and quick construction is well maintained by the phenomenal progress of the San Joaquin Light and Power Corporation's Kerckhoff project, some of the main features of which are described below. The rapid development of this plant is being followed with the greatest interest.—The Editor.)



View showing location of pump and pipe line for water supply for camp No. 4.

HYDROELECTRIC power development will have a record-breaking example of quick construction in the Kerckhoff project of the San Joaquin Light & Power Corporation. The plant, which is on the San Joaquin river a few miles below the Company's No. 1 power house, is to be completed by the early spring of 1920, and some 2,000 men will be employed to accomplish this. The water for the new power house will be taken from the main San Joaquin river, by means of a large concrete diversion dam and a system of tunnel and conduit over five miles in length. The dam is to be of the single arch masonry type, 100 feet. high, 400 feet across the top and 50 feet at the base. Its construction is requiring some very interesting feats of engineering. As it is impossible to divert the flow of the river during the construction period, one half will be built with a temporary opening in the lower part through which the river will flow while the other half is being constructed. About 30,000 cubic yards of concrete will be used.

The dam will create an artificial lake two miles in length, to be known as Kerckhoff Lake. This will be 100 feet deep at is deepest point.

Tunnel and Conduit System —

One of the outstanding features of the big work is the driving of 8400 feet of tunnel of 17 feet by 17½ feet through a mountain of solid blue granite. The roof is to be arched in solid rock, making it self-supporting. In addition to this unbroken stretch, some 9,000 feet more of tunnel will be made. The tunnel and conduit system will have a carrying capacity of 1500 second feet. Work on the tunnel is now progressing from both sides of the mountain simultaneously.

The Power House —

The power house will be the largest individual plant in the San Joaquin valley, its output of some 45,000 hp. exceeding by 5000 hp. the largest power house in operation.

The water will be delivered at a point on the mountain side above the power house into a specially constructed pipe line through which it will be dropped a vertical distance of 550 feet on the water wheels of the generating machinery. This force will drive three 15,000-hp. vertical Francis type turbine water wheels direct connected to generators of 11,500 kva. capacity.

A transformer layout which supplies power for compressor plants and for electric locomotives in the tunnel

Construction Equipment —

Two electrically operated standard gauge railway hoists have been installed down the precipitous mountain slopes to bring the supplies and materials to the scene of operations. Both hoists are operated with 100-hp. electric motors.

The construction of a suspension bridge at the dam site provided means of communication with the Madera county side of the river, but as it was not suitable for the transportation of heavy materials while the rock drilling crews were at work, an aerial cable line several hundred yards in length was swung across the canyon.

Six five-ton electric mine locomotives carry rock out of the tunnel, while twenty-two auto trucks are employed to haul materials from the supply depot at Auberry, where a large warehouse has been erected.

Steam shovels and the latest type air hammer drills mounted on cross bars are used in tunneling. From four to six drills are running constantly in each head every minute of the day.

This photograph, taken in July of the present year, shows the set-up for drilling in the tunnel face

Electric power lines have been extended to the different camps and scenes of operation. Big air compressor plants driven by electric motors supply 2000 cubic feet per minute at each end of the tunnel.

Immediately above the dam a large concrete mixer will be installed in the hillside, and the wet mixture will be poured by gravity through long conveyors to the concrete forms in the dam. The rock from the tunnel will be automatically fed into the mixer, which will have a capacity of 800 cubic yards a day.

In view of the rapid progress which the work is now making it is estimated that it will have reached completion by the scheduled time next spring. The existing power shortage in the San Joaquin valley is a special incentive for conducting the operations so intensively.

One of the compressor plants nearing completion. The compressor plants are driven by electric motors and supply 2000 cubic feet of air per minute at each end of the tunnel.

Modern Steel-Making by Electricity

BY HARRY ETCHELLS

(The demand for high-grade steels is being met by increasing installation of electric steel furnaces, forecasting a change in the industry which experts declare the most radical since the time of Bessemer. In the present article, Mr. Harry Etchells sets forth many of the modern features of the Greaves-Etchells system. The conclusions drawn as to other types of furnace are his own, and are interesting as showing the difficulties which the Greaves-Etchells designers sought to overcome.—The Editor.)

In electric steel making it is now generally recognized that the contact arc furnace is the most practical type of furnace to use as a steel making instrument. This type is exemplified by Heroult, Gronwall and Greaves-Etchells systems.

Heroult System, the First Developed —

The Heroult system is the oldest and was first applied with direct current and single-phase alternating current. It consisted in the early types of connecting two carbon electrodes with the two poles of electric supply and lowering these electrodes until they maintained an arc at the tip of each electrode and between each electrode and the metal in the furnace. When three-phase power became general three electrodes were used and each connected to the three angular points of a closed Delta system. The voltage on each arc is usually from 40 to 50, and a group of three transformers is usually interposed with both primary and secondary windings connected in mesh. It will thus be seen that each of the three electrodes is in phase with one phase each of the primary supply.

It will also be realized that it is impossible to take electrical load with only one electrode in contact, and that when only two electrodes are in contact all the electrical load is pulled on two primary supply phases. The only condition of balance on the primary supply is when all three electrodes are passing equal currents and are maintained with equal volts between each electrode tip and the steel. This condition can only be maintained even approximately when all the metal in the furnace has been melted and is lying in a pool with a level surface. When this condition is reached it is generally time to consider teeming the metal, so that for the greater period of operation the phase balance is very imperfect. Further than that, the introduced reactance into the system is the only buffer against very heavy short circuits which occur when two electrodes actually make good contact with the steel. Such contact may occur when an electrode slips in its holder or when a piece of metal dislodges in the furnace and falls against the tip of an electrode, thus short circuiting the arc.

Grave Operating Difficulties —

Perhaps the greatest operating difficulty in the Heroult system is experienced by reason of the fact that when automatic regulation is used the first electrode to make contact is not arrested in its descent, as the regulator keeps on winding it down until a proper circuit load is established. This does not occur until at least one of the other electrodes establishes contact, and in the meantime it often occurs that the first electrode has broken through being powerfully forced down upon the steel scrap forming the charge. In fact, the electrical engineer will readily appreciate that all the difficulties of regulating two arc lamps in series are encountered in this arrangement, on a large scale. To the metallurgist there is confusion, because if the steel happens to be molten the leading electrode will dip into the bath and will alter the carbon contents of the steel.

Girod was contemporaneous with Heroult and he overcame this difficulty by making his steel a permanent electrical pole and each electrode an independent pole. To accomplish this he introduced water cooled steel studs which penetrated right through the hearth lining of the furnace and which were electrically connected with the transformer system. Furnace men however are not in favor of having water cooled steel studs in contact with the molten steel, and furnaces embodying this principle are not likely to find favor.

The Gronwall Furnace —

The Gronwall furnace is designed as a two-phase system. The hearth of the furnace is made comparatively thin and conductive to an electric current. It is connected as a neutral to the two-phase system and the suspended electrodes are each connected to opposite phases. As soon as one electrode touches the steel a current is passed and the electrode arc can be readily adjusted. The hearth being a neutral, it is necessary to make it very conductive to electric currents or otherwise the currents will be pushed out of phase and pass from one upper electrode across the steel to another upper electrode, giving low power factor and phase out of balance. On the other hand if the bottom is readily conductive, a very strong surge occurs if anything happens to short circuit the arc. The system is a distinct advance on the Heroult system, however, and renders the use of automatic regulators much more simple. Using a three-phase or two-phase primary supply is possible, and in the case of three-phase primary a Scott connected secondary gives a certain amount of load distribution over the primary phases and only occasionally cuts out one primary phase.

The Greaves-Etchells designers have studied all these features very carefully and their arrangements have overcome the undesirable possibilities above referred to.

Greaves-Etchells Design —

In the first place, they realized that independent regulation of the electrodes was desirable.

Secondly, that whenever a short circuit occurred on one arc of an electrode, the surge should be distributed if possible over all the primary supply phases.

Thirdly, means should be taken to check short circuit and limit surges without impairing the permanent power factor of the furnace by introducing extra reactance.

To fulfill the first two conditions they decided that the furnace must have a conductive hearth, but to assist in fulfilling the third requirement they decided that this hearth should have a certain degree of electrical resistance and should thus act as a resistance check on short circuit. If they could have made the ohmic value of this hearth resistance equal to that of one arc gap, all would be simple and they could have used a three-phase system with two phases applied through separate groups of suspended upper electrodes and one phase applied to the hearth of the furnace. Such a scheme was impracticable for many reasons, but they succeeded in elaborating something which at first sight appears very similar.

In effect they use three transformer windings. The three primary windings are connected in mesh to the three phases of primary supply.

The secondary windings are in Star, and two legs are connected to the upper electrodes while the arc is connected to the hearth. The third leg, however, which is connected to the hearth, maintains a lower voltage than either of the other two. For instance, in one furnace with the operation of which I am connected, the lower leg maintains 25 volts, while each of the upper legs of the Star transforms to 50 volts.

The results are highly satisfactory to both electrical engineer and metallurgist. It is impossible by reason of the Star delta connection to throw load off any one of the primary supply phases, however the electrodes are manipulated. When the furnace is started cold, the full proportion of current does not pass through the hearth, but at least two-thirds of the total heating capacity can be obtained from the current which circulates across the bath between the upper electrodes.

During the short period required for warming up the furnace until the hearth becomes conductive, the power factor and phase balance are necessarily imperfect.

When the furnace is at working temperature the hearth conducts current perfectly and the electrical results obtained are abnormal as compared with other furnaces of the same class.

Perhaps I can convey a clearer impression of the type of furnace by describing the actual furnace which is under my observation.

Description of Typical Furnace —

The furnace itself appears as a rectangular steel box with stout bracing all around, and of internal dimensions, 10 ft. by 12 ft. It is mounted on rockers to tilt and is rocked by two geared tilting shafts. Four steel masts are mounted on the furnace body and these form the guides and supports for independently operated carriages which travel four electrodes up and down. The electrode raising and lowering is accomplished with small electric motors and

these can be operated by push button or by automatic control.

The electrical connections of the furnace are equivalent to those of two furnaces. That is, the furnace is equipped with two banks of Star connected transformer secondaries, and the two sets of mesh connected primaries work in parallel. Thus one side of the furnace can be operated quite independently.

The three phase supply is at 2300-v., 60-cycle. The total kva. of the equipment is nominally 1300, being 650-kva. on each bank of transformers. Heavy copper conductors convey a current of 4000 amps. to each electrode and the automatic regulators can be set to maintain this amperage or any desired variation on same.

Operation of Furnace —

The splitting up into two banks of transformers precludes to a great extent a surge on the whole system, as both sides of the furnace are not likely to short circuit at once. The Delto Star grouping momentarily lowers the power factor and introduces a momentary out of phase inductance check against the short circuit occurring between any pair of electrodes. I am fortunate in being able to cite some kilowatt meter records taken with an ordinary graphic recorder. From these it was seen that steady load is established in the first fifteen minutes and then is maintained right up to maximum demand until the charge is melted. Even momentary bumps shown on the recorder do not exceed 1500 kw., while a mean load of 1300 kw. is maintained. This makes the furnace most suitable for meeting maximum demand scale power renting conditions, and further ensures the quickest possible melting with the power available, because no time is lost in breaking and re-establishing an erratic electrical load.

Metallurgists inform me that the furnace gives much better operating conditions than they have experienced with other furnaces. The lining is simple and consists of silica roof and side walls and a basic bottom. The bottom may be burnt magnesite or dolomite and this is rammed with tar. A copper plate is inserted in the bottom to make electrical contact. The Greaves-Etchell people have also developed an acid lining which by a special treatment they have made electrically conductive, so that there is no bar to adopting the system for acid or basic linings.

The operation consists in charging steel turnings, punchings, and similar scrap and melting down with lime and iron oxide. Carbon is burnt out during melting and manganese and phosphorus pass almost entirely into the slag, which is then removed.

A new slag of lime, sand and flourspar is made up and when fluid is treated with powdered coal until the slag is white and free from metallic oxides, the steel is effectively deoxidized and quiet. Both samples are taken from time to time and allow additions made at the close of the heat.

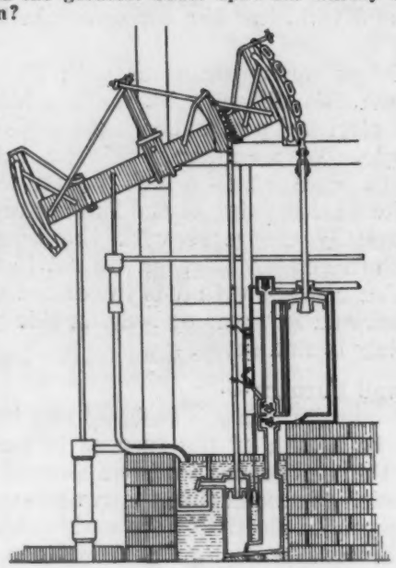
Two remarkable features are to be noted. Having charged the furnace and applied the power, the melter can sit down and quietly wait till the charge melts. It requires no poking. Secondly, when melted the metal is maintained at a uniform heat all over the bath and requires no stirring up. It is well known that in other furnaces the steel at the bottom of the bath is quite cold when the top metal is too hot, and enormous wear occurs on the lining in consequence.

The furnace takes about 4 hrs. to melt and 1 hr. to refine, starting with a cold furnace each morning, giving a power consumption of 900 units per ton; but with continuous operation I have no doubt that we can melt in 2¼ hrs. and conduct the whole operation for 700-kw.hr. per ton of metal melted.

ENGINEERS OF YESTERDAY—16. WATT

(Series Compiled by A. L. Jordan)

What is generally regarded as the invention which has had the greatest effect upon the history of civilizaton?



Watt Pumping Engine, 1769 A. D.

The invention of Watt, which was not, strictly speaking, an invention at all, may be designated as the commercial or industrial development of the steam engine.

James Watt (b. Greenock, Scotland, 1736) made acquaintance with some of the professors in Glasgow college, afterward spent some time in London, returned and became instrument maker at the college. Upon repairing a model of Newcomen's "engine," his attention was directed to its inherent defects, and soon afterward (1765) the great idea of the separate condenser came to him. This involved the addition of an "air-pump" and was followed by the double-acting engine, the principle of expansive working, the compound engine, the centrifugal governor, the indicator, the steam jacket and other improvements. His inventions in other lines include a letter-copying press, a telescopic micrometer and a machine for copying sculpture. His life represents a triumph over great poverty, business reverses and ill health.

No outline of his life would be complete without mention of Matthew Boulton, with whom Watt became associated in 1773. "Boulton was more than a man of business, he was a man of culture." "Never were two men more supplementary to each other than Boulton and Watt, and hence their success," says Andrew Carnegie in his book, "James Watt." In 1819 Watt died and at Heathfield, "in the parish churchyard, alongside of Boulton, he was most appropriately laid to rest." "Thus the two strong men, lifelong friends and partners, who had never had a serious difference, in their death were not divided."

PRACTICAL LESSONS IN ELECTRICITY

BY H. H. BLISS

Western power plant illuminated by flood lighting. This system of outdoor illumination of buildings first came into extensive use in the Panama-Pacific Exposition of 1915.

LAMPS AND ILLUMINATION

Commercial and home portrait photographers use gas filled Mazdas in deep reflectors to illuminate their subjects.

ALL sorts of lamps are used for producing artificial light, but in this country the incandescent lamp is used to a greater extent than all others combined. Until recent years the carbon filament lamp of this type was the standard, but the superior economy of metallic filaments has caused the carbon lamp to be practically displaced by the tungsten lamp. The latter gives approximately three times as much light as the former for the same power consumption.

In lamps of medium and large size it is found that the efficiency is increased by filling the bulb with an inert gas, such as nitrogen. The ordinary tungsten lamp has the air removed, the filament being allowed to glow in an almost perfect vacuum. The gas permits the filament to be heated to a higher temperature. This means that a larger proportion of the energy expended in heating the wire is radiated off in light waves. For instance, the vacuum lamp in the 100-watt size gives only 80% as much light as the gas filled 100-watt lamp.

Lamps carrying large currents have better efficiencies than those of smaller amperage. The 200-watt 220-volt Mazda has the same efficiency as the 100-watt 110-volt lamp, and only 86% as high efficiency as the 200-watt 110-volt lamp.

Candle Power and Foot Candle.—If an incandescent lamp, hung in the usual position with base upward, gives off in a horizontal direction as much light as a standard candle, it may be called a "one candle power" (one c.p.) lamp. More accurately we say that its "horizontal power" is one. This point must be emphasized, for the amount of light sent in other directions is not the same.

If a lamp is located at the center of a globe or sphere, it sends light to nearly every point on the inner surface, but different amounts to different places. The average candle power in all directions is called the "mean spherical candle power," and it is usually considerably less than the "horizontal candle power." Ordinary lamps have a mean spherical c.p. equal to about .8 of the horizontal c.p.

If a very concentrated one c.p. light is one foot from a wall, the illumination at the point on the wall nearest is one "foot candle." Every other part of the surface is less brightly lighted, since it is more than a foot away. However, if the wall were warped so that a considerable part of it was exactly one foot from the light, the illumination would be one foot candle all over that part. A spot on a wall one

Warehouse lighted by large lamps (300-watt gas filled) at a total expenditure of .15 watt per sq. ft. What is the size of the squares into which the ceiling is divided by the lighting fixtures? What part of the light is wasted if the illumination averages one foot candle at the working plane?

foot from a lamp of 20 horizontal c.p. would be illuminated with an intensity of 20 foot candles.

For various purposes different intensities of illumination are required. In the operating room of a hospital the illumination on the "working plane" (the plane level with the table top) should be 12 or more foot candles; in a dining room 2 foot candles would be satisfactory. Following are the suggestions of various illuminating engineers for a few cases:

Auditorium	1 to 3	Lavatory	2 to 6
Cigar Store	4 to 6	Library (tables)	3 to 4
Coil Winding	4 to 12	Office	4 to 10
Department Store	4 to 10	Outdoor Construction	.5 to 2
Drafting Room	7 to 12	Proof Reading	4 to 12
Drug Store	3 to 8	Residence-Cellar	0.6
Elevator	1 to 3	Residence-Kitchen	2.0
Engine Room	3 to 9	Residence-Parlor	1.5
Garage	3 to 9	Shoe Store	3 to 5
Grocery	3 to 6	Stairs and Halls	.5 to 2
Laundry	3 to 9	Telephone Exchange	3 to 9

Reflectors.—Reflectors or shades are used with nearly all incandescent lamps, though they absorb much of the light and therefore are far less than 100% efficient. A surface of porcelain over steel, which is much used in shop and factory reflectors, absorbs about 35% of the light that falls upon it.

There are two good reasons for the use of bell-shaped reflectors for interior lighting: (1) they put the greater part of the light where it is wanted and (2) they protect the eyes by making it impossible to see the glaring filament unless one looks in an unusual direction. An ordinary bare lamp throws very little light downward (past the tip), and so is very inefficient if hung vertically over the work to be lighted. Furthermore the intense light which enters the eye of a person who has a bare lamp within his angle of vision is not only annoying but also painful and injurious.

Indirect Lighting.—In some cases the reflectors are turned upside down and arranged to throw all the light toward the ceiling. Then the useful light in the room is **only** that which is reflected downward from the ceiling or from special white surfaces placed above the lamps. This is known as "indirect" or "totally indirect" lighting. Note that the reflectors are completely opaque.

The method is very considerably adopted because it gives freedom from eye strain. It requires more wattage than any other system, and tends to decrease rapidly in efficiency on account of the collection of dust. Some objection is made to indirect lighting on the ground that shadows are largely eliminated, which makes it difficult to see the details clearly. It has been claimed, however, that with the same eye fatigue from two to five times as much drafting and similar work can be done under indirect lighting as with any other artificial light.

A modified method, known as "semi-indirect" lighting, is widely used. A translucent reflector is

Indirect lighting in the new and beautiful California Theater, San Francisco. Note the individual reflector for each lamp.

used under the lamp permitting a portion of the light to come through as well as reflecting much light to the ceiling. This is fairly efficient and has many advantages, but is open to some of the objections to both the ordinary and the indirect systems.

If reflectors were perfectly efficient and walls and ceilings reflected all the light that reached them, absorbing none, the total light flux from the lamps would reach the working plane. In most installations it receives only from 20 to 60% of the light emitted by the lamps.

Local lighting gives the largest proportion of the total light of the lamps at the point of use

By multiplying the required foot candle intensity in any room by the area of the working plane (which equals the floor area) we obtain a measure of the useful light necessary. This figure has to be multiplied by a factor of from 1.7 to 5 or more to find the total light the lamps must give. Below are listed some approximate factors for small rooms with light ceilings:

Reflector	Light Walls	Dark Walls
Prismatic glass bowl	2.7	3.0
Steel bowl (deep)	2.6	3.6
Light opal glass	3.4	3.7
Totally indirect	5.0	6.2
Semi-indirect	4.3	5.3

A 25-watt Mazda lamp has a mean spherical candle power of 17.7. If it were surrounded by a spherical shell one foot in radius, the inner surface of the shell, being one foot from the lamp, would receive an average illumination of 17.7 foot candles. As there are 12.57 sq. ft. of surface, the total light emitted by the lamp may be figured as $17.7 \times 12.57 = 223$ units. Similarly a 500-watt gas filled lamp (mean spherical c.p. = 694) produces a flux of $694 \times 12.57 = 8720$.

Such numbers are found in the following table for the most common lamps:

Ordinary Tungsten			Gas Filled (Mazda C)		
Watts	Spherical c.p.	Total light	Watts	Spherical c.p.	Total light
15	10.0	125	75	69	865
25	17.7	223	100	100	1257
40	29.4	369	150	163	2050
60	45.8	575	200	232	2920
100	79.5	997	300	385	4830

What size lamp should be used in the six indirect lighting fixtures in a reading room 23 x 30 ft. with light ceiling and dark walls? Take foot candles = 3.5 by the first list; the area = 690 sq. ft., hence the useful light $= 3.5 \times 690 = 2415$ units. The total light = 6.2 times this, or 15,000 units, which requires 2500 units of light from each of the six fixtures. Hence, select 200-watt gas filled lamps.

Similar calculations are made for many effective lighting installations, but the design is not generally as simple as this example might suggest. Considerations of art, utility, and the plans of the owners and architect complicate the situation, so that much study and experience are required to develop power to plan satisfactory lighting systems.

REPAIRING BOILERS OF STEAMSHIPS BY THE ELECTRIC OR OXYACETYLENE PROCESSES

The British Board of Trade has now published for official use an instruction to surveyors of vessels on the subject of making repairs to the boilers of passenger steamers by the electric or oxyacetylene processes.

The repairing of boilers of passenger steamers by the above processes has been tentatively in operation for a considerable period and, in view of the experienced gained, the surveyors are informed that, provided the work is carried out to their satisfaction by experienced workmen, these processes may be employed, within limits, for repairing cracks in furnaces, combustion chambers, and end plates of boilers, and in the same parts for reinforcing the landing edges of leaky riveted seams which have become reduced by repeated chipping and calking.

It has also been noticed that a shell plate of a cylindrical marine boiler cracked recently through a solid part where some surface welding had been done by the electrical process two years ago. The welding had extended for a length of about 12 inches along the outside calking edge of one of the middle circumferential seams at the bottom of the boiler, the leaky edge of the seam and the adjoining shell plate having been covered (soldered) by metal deposited by this process in the usual way. The shell plate was 1 5/32 inches thick and the crack, which followed the line of surface welding, extended in a circumferential direction for a distance of 2 feet 9 inches, the welded part being situated midway along the crack. No welding should be done to these parts by any process which may cause local heating over an appreciable area of the plate, such as the oxyacetylene, oxyhydrogen, or other similar methods.

FUEL OIL AND STEAM ENGINEERING

(The indispensable part which oil plays in modern industry emphasizes the importance of any device by which it is rapidly and cheaply made ready for use. That the necessary process of dehydration can be accomplished by electricity with remarkable efficiency and economy, is shown in this discussion of electrical dehydration by the Commercial Engineer of the Southern California Edison Company.—The Editor.)

ELECTRICAL DEHYDRATION OF OIL

BY H. N. SESSIONS

Electrical dehydration, or the removal of water from crude oil by electricity, is so far advanced in every respect as compared to other methods of separating water from crude oil that its adoption is virtually a necessity.

The separation of water from crude oil can also be accomplished by the application of heat, centrifugal force, or by chemical action. Prior to the supremacy of electricity being established in the dehydration of oil, the treatment by heat was the one commonly employed. Petroleum producers have wrestled with the problem of removing water from crude oil ever since oil was discovered.

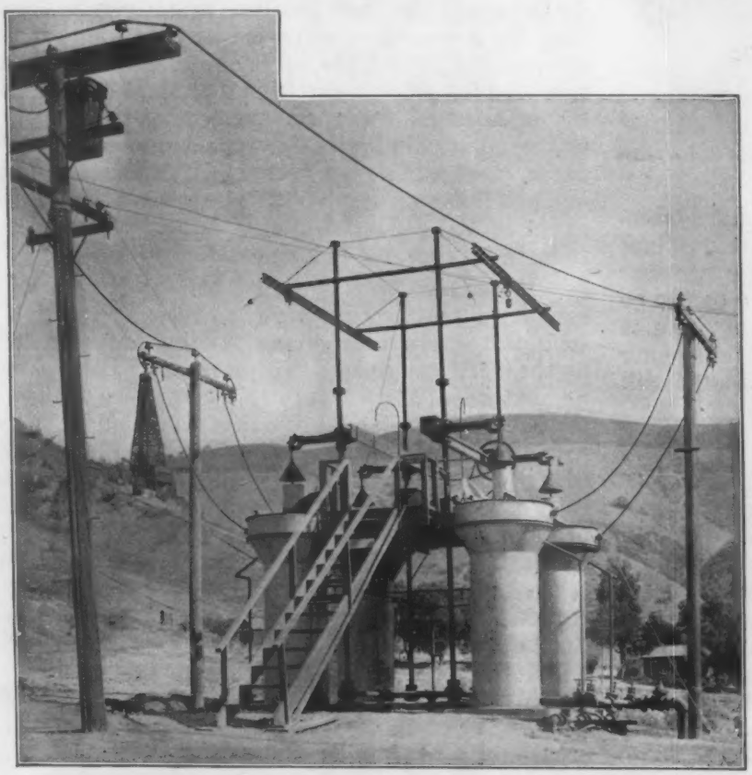
Appearance of Water in Crude Oil

The presence of water in crude oil is natural and inevitable, and is caused by the infiltration of water into the strata of oil bearing sands. A mixture of oil and water is always encountered to a greater or lesser extent. Water may be present in crude oil in the form of large free globules which will settle out in time if allowed to stand, due to their greater specific gravity, or small particles of water may be held in suspension or trapped in emulsion with the oil, and these will not settle out at normal temperatures and pressures even if the mixture is allowed to stand indefinitely.

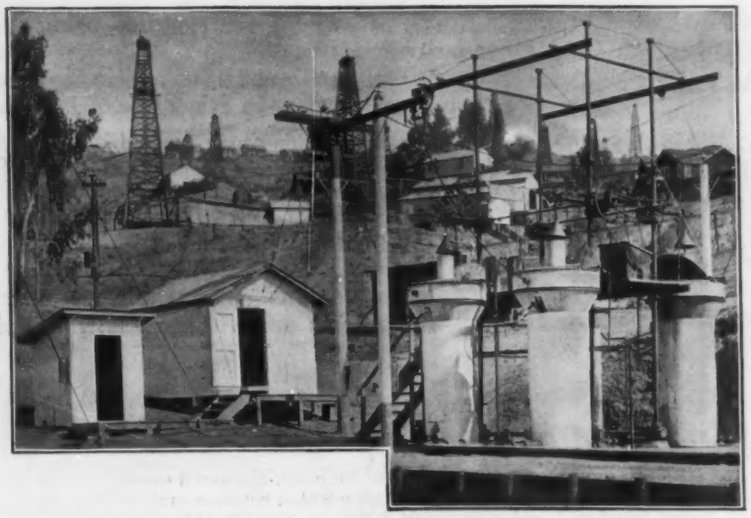
The weight and volume of the water particles carried in suspension depends upon the viscosity, temperature and gravity of the oil, hence there is no fixed ratio between the water held in the free globules and that contained in the particles of water in emulsion. Some producers dispose of their crude oil without extracting the water from it and the purchaser is allowed a rebate on the percentage of water he is able to prove the oil contains. Such practice is characteristic of the early-day wastefulness in the oil fields when little regard was given to economy and efficiency in the handling and marketing of crude oil.

Economies of Immediate Dehydration

Not to dehydrate at the wells works an injustice to all concerned. The carload freight rate on crude oil from Taft to Los Angeles is 52 cents per barrel and the shipment of a 12,500-gallon car of un-dehydrated oil which carries 35 per cent water in emulsion, means that somebody must needlessly stand the expense, amounting in this case to about $49.00, for the transportation of about 4,000 gallons, or 30,000 pounds of water in this car. This cuts down the useful capacity and purpose of expensive and needful



The usual electrical dehydrating plant is made up of four treaters and operates on a single-phase alternating current at a pressure of 11,000 volts. It treats oils of different grades at the same time without in any way impairing their efficiency, and with practically no loss of gasoline. The electrical process leaves the oil its natural color, while the heating process impairs its market value by discoloring it. Oil containing eighty-five per cent emulsion has been successfully dehydrated electrically.



The installation of electrical dehydrators at the wells results in a tremendous saving in transportation costs. The shipment of un-dehydrated crude oil involves the unnecessary expense of paying heavy freight charges for large quantities of water in emulsion. Immediate electrical dehydration is not only more efficient but more economical than the older method.

rolling stock and really makes the actual freight cost of the oil delivered, less the water, six cents per barrel, when the oil could be dehydrated electrically before shipment, including all costs and royalty, for less than two cents per barrel with electricity at two cents per kilowatt-hour.

There are seventeen electrical dehydrating plants now operating in the Whittier district. The first electrical dehydrator was installed by the Standard Oil Company in 1913, on the Murphy-Coyote lease. The oil companies using the electrical equipment are enthusiastic over the results obtained and in many cases oil heretofore unfit for use and rebellious to other methods of dehydration is made marketable by the process of electrical dehydration.

No Loss of Gasoline

The oil treated in the above mentioned seventeen plants ranges from 15 per cent to 50 per cent water and the average amount of oil net after treating is approximately eighteen barrels per kilowatt-hour, or one-ninth of one per cent per barrel for electricity at the rate of two cents per kilowatt-hour. Electrical dehydration causes practically no loss of gasoline and the records show that after treatment the gravity of the oil has been raised from one to two degrees and has in consequence an increased market value. This increase in market value in some cases is enough to pay the cost of dehydrating. The opposite is true in the heating process, because crude oil containing any appreciable gasoline will suffer evaporation under the temperature necessary to break down the emulsion, and naturally the loss of gasoline means less dehydrates, less gravity and less market value.

The heating process necessitates close watchfulness; the electric, practically none. The heating process discolors the oil, impairing its market value; the electric dehydrator clarifies the oil, leaving its natural color. The low fire hazard with electricity is important.

Savings in Time and Cost

A record run of 7,000 barrels of the same grade of crude oil was made, first by the heating process, then by the electrical. Eighteen hours was required with heat and only 7.5 hours with electricity, the net amount of oil being 5,060 bbls. with the former process and 5,160 bbls. with the latter. The total cost by the heat process for this run was $387.00, or seven and one-half cents per barrel, while the entire expense with electricity, even including a royalty of half a cent per barrel, was $102.00, or slightly less than two cents per barrel.

The electric dehydrator effectively treats oils of different grades at the same time without in any way impairing their efficiency. On a test, 28 gravity crude oil containing 25 per cent emulsion at a temperature of 78 degrees, was cleaned simultaneously and separately with 13 gravity oil containing 30 per cent emulsion at a temperature of 180 degrees, by the same electric dehydrator, and the dehydrates showed only 1.3 per cent water and foreign matter in suspension, a limit of 2 per cent being permissible.

Oil containing eighty-five per cent emulsion has been successfully dehydrated electrically. The Quintuple Oil Company in the Whittier district electrically dehydrates oil as it comes from the well from a mixture of twelve per cent water to only one-tenth of one per cent.

The Electric Dehydrating Plant

The electric dehydrating plant is made up of units called treaters and the usual size is a four-treater plant and the cost installed is about $2,000 per treater. The cost of installation is generally borne by the oil companies and the ownership of the dehydrator is retained by the manufacturers, who also exact a royalty from the oil companies on each barrel of dehydrate produced.

There are several successful electric dehydrators on the market now, the one most used being manufactured by the Petroleum Rectifying Company of California. This company claims to have placed machinery which is now cleaning about two million barrels of emulsion per month. In general, the electric dehydrator operates on a single-phase alternating current at a pressure of 11,000 volts, the voltage being stepped up from our regular service of 440 or 2200 volts. The emulsion is passed between highly charged electrodes and in this electrostatic field the small globules and particles of water, by static attraction for each other, form in chains which in turn

coalesce into free water which readily settles to the bottom of the treater and is drawn off. In certain leases where water is very scarce, the water electrically removed from the oil is of considerable value.

Due to the condenser effect caused by the highly charged electrodes, the electric dehydrator operates at about 98 per cent leading power factor. The average maximum demand is four kilowatts, the average load factor fifty per cent and the average gross income is approximately $25.00 per month. This is small but important, as the actual necessity for electrical dehydration is being the means of our electrifying entire leases where electricity is being used for other purposes.

The great war has forced us to realize the necessity of thrift and economy in every line of industry, and especially in the conservation of our natural resources, and second to none of these is oil. From the foregoing, it can be readily seen that the dehydration of oil by electricity is not only an economic essential to the producer and the consumer but to the welfare of the nation as well. The producer is fully realizing the absolute need of the electric dehydrator and the near future will see that he is not without it.

Pulverized Coal as Fuel

(The fact that lignites can be utilized best in pulverized form makes the much-discussed question of powdered coal one of particular interest to the Pacific Coast states, which produce mainly lignites. The Northwest has been using powdered fuel with marked success, and the following discussion presents further information on its advantages. The data is extracted from a paper by N. C. Harrison, recently read before the American Society of Mechanical Engineers at Detroit.—The Editor.)

Pulverized coal was first used in the United States about twenty-six years ago for the economical burning of the cement rock in the rotary kilns of the portland-cement industry. The application of this form of fuel has been gradually taken up by engineers connected with other industries, and today a large amount of pulverized coal is used in the steel and copper industries and in rotary kilns other than the cement industry. It is used with great success in the open-hearth steel plant of the American Iron & Steel Manufacturing Company of Lebanon, Pa., having many advantages over producer gas as a fuel for open-hearth furnaces. In the operation also of stationary boiler plants it has been found to possess many desirable features.

The results of a test of a 468-hp. Edge Moor boiler with pulverized coal equipment showed a greater net efficiency than was found in a stoker-fed boiler in the same plant.

1. Fuel Preparation Costs —

a The cost of crushing the coal. This expense is the same for pulverized-coal equipment as for stokers.

b The cost of drying and pulverizing the coal. Although no cost records are available at present, it is estimated that 32 cents per ton will cover this preparation cost on a 200-ton-per-24-hr. plant using bituminous coal containing about 12 per cent moisture.

c The maintenance costs of the drying and pulverizing plant. This unit has not been determined from actual experience; however, it is estimated that 3 cents per ton will cover the maintenance. In stoker practice the maintenance cost per ton of fuel fired is close to 5 cents per ton.

Summarizing the above facts it is evident that, with fuel at $5 per ton, the gross efficiency shown by the pulverized-fuel boilers will have to exceed that shown by the mechanical-stoker-fired boilers by 6 per cent in order to offset coal-preparation costs. A 6 per cent deduction from a gross efficiency of 85.22 per cent results in a net efficiency of 79.22 per cent for the powdered-coal burner. In stoker practice the maximum attainable gross efficiency at any of our plants has been 80.54 per cent. Deducting the 2.5 per cent for auxiliary uses, the resulting net efficiency is 78.04 per cent, which is lower by 1.18 per cent than the figure obtained in pulverized-fuel practice.

2. Miscellaneous Advantages Resulting From the Use of Pulverized Fuel —

a Continuous boiler operation at a uniform rating as well as a constant efficiency is made possible. At no time is there a loss in capacity due to the clinkering of coal on the grates or the cleaning of fires, as is the case in stoker practice.

b Heavy overloads can be taken on or dropped off in a very brief time through adjustment of the coal feeders and the furnace drafts.

c From 97 to 98 per cent of the combustible in the coal is utilized, regardless of the quality of the fuel.

d The ash-handling costs are reduced to a minimum due to the reduced volume.

e The banking conditions when operating with pulverized coal are somewhat different from those obtained in stoker practice. By stopping the fuel supply and closing up all dampers and auxiliary air inlets a boiler can be held up to pressure for about 10 hours. The furnace brick work having been heated to incandescence during operation gives off a radiant heat which is absorbed by the boiler rather than being sent out through the stack. The ease of controlling the fuel, feed and drafts, the ability to take on heavy overloads in a brief time, the thorough combustion of the coal and the uniform high efficiency obtainable under normal operating make pulverized coal a most satisfactory form of fuel for central station uses.

The full story of maintenance expense is only partly known as yet, however. Indications are that no unusual difficulties will be met. The cost of fuel preparation and labor for operating a boiler room fully equipped with pulverized-coal-burning boilers will be a question for the engineer to decide for himself according to his particular conditions. If properly installed with respect to capacity of storage, size of drier and pulverizers, and on a sufficient number of boilers to properly and fully employ the minimum number of men, the pulverized-fuel installation will undoubtedly be more advantageous. The main item that must be borne in mind by engineers is that the ease with which a high efficiency is obtained and the constant nature of that efficiency, as compared to the lack of constancy of efficiency in a stoker-fired boiler, unless very closely supervised, is the one factor about the burning of pulverized fuel which justifies its use. There is no doubt that with a well-

equipped plant burning pulverized fuel, having all the necessary recording and indicating instruments to guide the operators in maintaining the proper conditions, a lower cost of generating steam will be possible than has heretofore been the case in any type of equipment.

LOG OF TEST OF A PULVERIZED-FUEL-BURNING STATIONARY BOILER. DATE, AUGUST 12-13, 1918.

Make of boiler				Edge Moor
Rated hp.				468
Heating surface, sq. ft.				4685
Time fired or test started				11:15 a.m. 8/12/18
Time fire out or test finished				11:15 a.m. 8/13/18
Duration of test				24 hr.
	Maximum		Minimum	Average
Temperature of boiler room (deg. Fahr.)	99		85	93.3
Temperature of feedwater	168		135	157.2
Temperature of steam (deg. Fahr.)	477		427	448.7
Barometer in. of mercury	29.35		29.20	29.25
Temperature of flue gases (deg. Fahr.)	515		455	495.3
Average boiler pressure, lb.				167.0
Atmospheric pressure, lb.				14.4
Temperature of steam, deg. Fahr.				373.8
Superheat, deg. Fahr.				74.9
Safety valve set for, lb.				175
Fuel fired per hr., lb.				1,990.6
Total fuel, lb.				47,775
Total water, lb.				393,168
Water apparently evaporated per hr., lb.				16,393.0
Water apparently evaporated per lb. of coal, lb.				8.23
Factor of evaporation				1.1502
Water evaporated from and at 121 deg. Fahr. per lb. of coal				9.47
	Maximum		Minimum	Average
Carbon dioxide (CO_2) per cent	15.4		12.2	13.85
Oxygen (O) per cent	5.6		3.2	4.38
Carbon monoxide (CO)				None
Fuel used				Bituminous screenings
Amt. of coal represented by each sample, lb.	19,775	20,000	8,000	.....
Per cent of total	41.3	41.1	16.9	.....
Moisture (per cent)	10.3	11.0	9.7	10.49
Volatile (per cent)	33.81	36.96	38.77	35.96
Fixed carbon (per cent)	50.43	49.13	48.29	49.53
Ash (per cent)	14.36	13.91	12.94	13.93
Sulphur (per cent)	1.90	2.06	2.12	2.04
B.t.u. as received	10,600	10,763	11,263	10,779
B.t.u. dry	11,817	12,093	12,473	12,045
Vacuum in burner, in.				0.000
Vacuum under primary arch, in.				0.000
Vacuum in combustion chamber, in.				0.000
Vacuum in first pass, in.				0.000
Vacuum in second pass, in.				0.0057
Vacuum in breeching, in.				0.09
Pulsation				None
Feeder speed, r.p.m.				No. 1, 53.6; No. 2, 50.7
Coal per rev. of screw, lb.				0.318
Accumulation of slag on tubes				None
Flues blown during test				5 times
Operation of furnace				Very satisfactory
Pulsation				None
Condition of smoke				Light
Heat effect on brick				None
Back lash of flame in burner				None
Pounds of steam per hr. from and at 212 deg. Fahr.				18,842.6
Horsepower				546.2
Per cent of rating				116.7
Boiler efficiency, per cent				85.22

SIMPLE DEVICE DETERMINES PHASE ROTATION

BY W. C. HESTON

(A contrivance for overcoming one of the various small operating difficulties experienced by central stations.—The Editor.)

The need for a simple device for determining phase rotation has long been felt by companies operating distribution systems.

It is often inconvenient, and sometimes impossible to find a motor which can be started, to determine whether the direction of rotation is correct, when transformers are replaced or moved, or when some line or sub-station changes are made, especially when such changes are made on Sunday, as is nearly always the case.

By means of the device shown in the photograph herewith, and an ordinary voltmeter, the relative direction of phase rotation, on independent circuits, or on the same circuit before and after changes have been made, is easily determined.

Details of Construction —

This device consists of a noninductive resistance coil, and a highly inductive coil, connected in Y, with

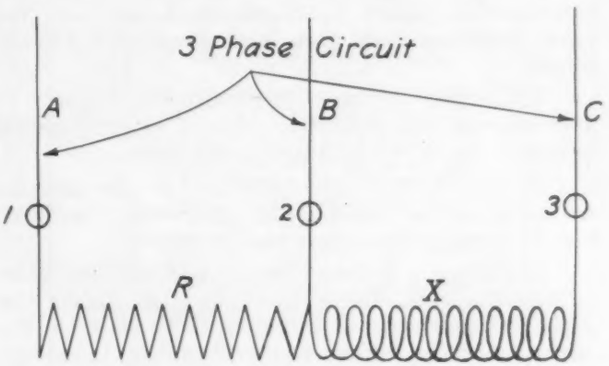


Figure I

Diagram showing how the device for determining phase rotation is connected to a three-phase circuit

an ordinary voltmeter, and placed across the three phases of a three-phase circuit.

The resistance coil consists of four resistances taken from a portable voltmeter box, and the reactance coil consists of 600 turns of No. 22 wire wound

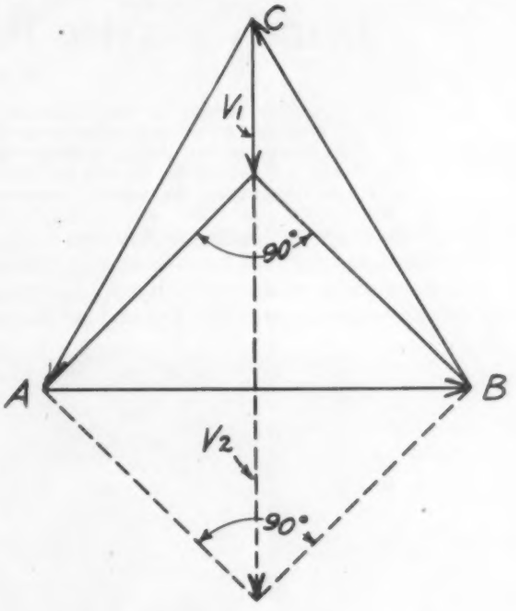


Figure II

Diagram showing principle of operation. With one direction of rotation the voltage V-1 is obtained, and with the other direction of rotation the voltage of V-2 is obtained.

on a laminated iron core having a cross-sectional area of one square inch.

The resistance coil has a resistance of 140 ohms, and the reactance coil has an impedance of 75 ohms. The impedance of the reactance coil should really be equal to the resistance of the resistance coil, but the device works equally as well with the above values of resistance.

To Use the Device —

Figure I shows how the device is connected to a three-phase circuit, and Figure II shows vectorially the principle of operation. With one direction of rotation the voltage V 1 is obtained, and with the other direction of rotation the voltage of V 2 is obtained.

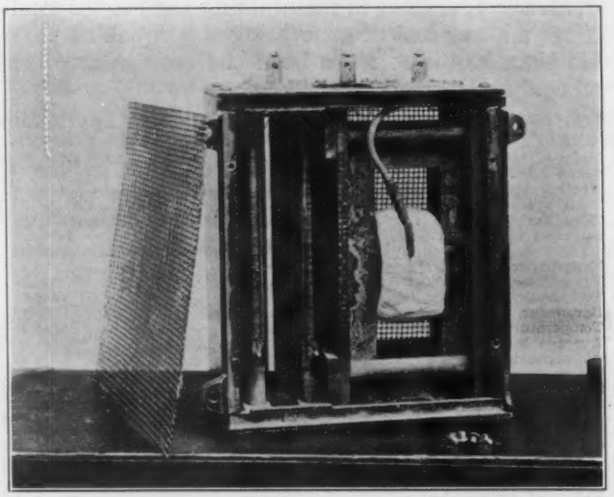
To use the device it is then only necessary to note whether the voltmeter gives a reading above, or below, the normal voltage of the circuit.

If a low reading is obtained before the changes are made, and a high reading afterward, the direction of phase rotation has been reversed.

In making a series of tests, care must be taken to have the same side of the instrument facing the observer on all tests, and to have the leads from the instrument to the circuit being tested, run in exactly the same manner in each case, as turning the instrument around, or crossing the leads, will compensate for a reversal of phase rotation.

Field of Application —

The device can be used on the secondary of 50-watt 110-volt potential transformers, or on 220 and 440-volt three-phase circuits. When used on 220 and 440-volt circuit the current taken will be two and four times the current respectively taken when used on 110-volt circuits. The high current taken when used on the 220 and 440-volt circuits is of little consequence, however, as it is necessary to have the instrument in the circuit only a few seconds when making a test.



This device consists of a non-inductive resistance coil and a highly inductive coil, connected in Y, with an ordinary voltmeter, and placed across the three phases of a three-phase circuit.

Library Service in a Business Organization

BY T. D. SCHAFTCHENKO

(The practical service of the business library and the invaluable part which it plays in keeping all branches of an organization in touch with current developments is strongly brought out in this account of the actual working of the library of a large electrical concern. Following the series by Louise B. Krause on the Business Library, this article is particularly appropriate as illustrating the definite success which has attended ventures of this kind.—The Editor.)

The library of the National Carbon Company, Inc., Cleveland, is operated on a distinctly individual plan and employs a system which will prove interesting to the many persons confronted by the problems of the special library. The plan incorporated here is the outcome of the endeavor to be of the greatest service to the greatest number of persons. In the formulation of this plan it was necessary to bear in mind the problems of the numerous company plants scattered throughout the country and also the means of serving these plants.

The circulation room is headquarters for the library's effective system of handling requests for special material, and is one of the busiest rooms in the office.

The library is an adjunct of the Publicity Department, a department whose duty it is to keep all of the various units of the company informed as to new methods of manufacture, expansion of trade, newly derived uses for the products made, data on what competitors are doing, and all new literature on subjects pertinent to the company's activities. The library contains approximately 4000 volumes of the latest literature pertaining to the manufacture of carbon and the allied industries. The technical journals pertaining to the carbon industry are also bound and form a part of the collection of books. The company subscribes to approximately 110 technical, trade and business papers. Of some of the important publications a number of copies of each issue are bought to take care of the demand.

The Weekly Index —

One of the special features of the library service is the publication of the Weekly Periodical Index and Review. This Weekly Index, as it is generally called, contains a record of all of the articles of interest to the company which have appeared in the current trade and technical magazines to which the company subscribes. It further contains a list of new books,

pamphlets and patents received. The Weekly Index is sent regularly to any employe of the National Carbon Company upon request to the Publicity Department. At the left of the sheet, space is provided for filling in the name and the department of the person receiving the Index. After checking the articles desired the Index is returned to the Publicity Department where the proper records are made, after which the Index is again returned to the sender.

As the magazines come in they are distributed by the Circulation Department to the persons requesting them, giving preference to persons most vitally interested in the information contained in the magazine. A list is made of all inquiries for magazines or articles noted on the Weekly Index and where there are several persons waiting for the same item it is sent to each in turn. This list is termed the "waiting list." After the magazines noted have been circulated to all wishing to see them and are returned to the librarian, all the articles noted are filed according to a special decimal system which was designed to meet the particular requirements of the carbon industry. The articles in magazines which are not bound are clipped and filed and are cataloged on large manila cards so that any one article can be quickly located. Also if at any time all of the miscellaneous articles under any one heading are to be reviewed it is possible to locate them all together.

The Mailing List —

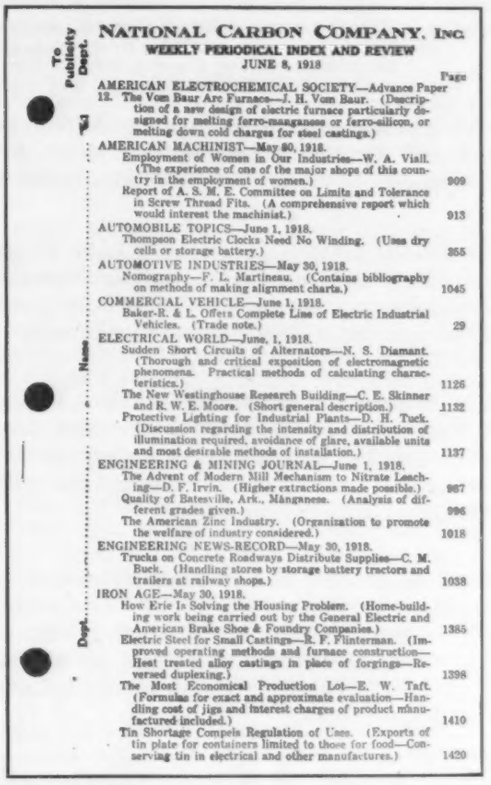
A separate list is kept of all persons desiring to receive certain magazines regularly. This list is termed the "mailing list." This list is carefully selected and includes only those persons who, because of their type of work, would be expected to keep in touch with the particular publication in question. The person whose name is on the mailing list for a certain magazine will receive this magazine regularly without checking it on the Weekly Index. Anyone may have his name put on the mailing list for any magazine by notifying either the librarian or the Publicity Department to this effect. The mailing list, however, applies to magazines only. All magazines may be kept for one week excepting those which have a very large circulation. In this case magazines may be kept only four days and are distinguished from the other periodicals by a red label pasted on the front cover.

Circulation Room System —

The circulation room is one of the busiest rooms in the entire office. The clerks in this department, under the supervision of the librarian, send out on an average 700 magazines, 100 books and 50 patents weekly. This entails an almost endless amount of work. It means card indexing all of the requests for articles which come in on the Weekly Index; it means making cards and pasting pockets in all of the magazines; sending out indices, checking in the magazines, books and patents. On each magazine is pasted that part of the Weekly Index which has reference to its contents.

Using the Public Library —

The Publicity Department has special membership cards for both the Cleveland Public Library and the Case Library on which books may be drawn in the regular way. Lists of all the magazines and periodicals received regularly by both these libraries are on file in the Publicity Department. The Industrial Arts Index, a series supplied by a New York



To Publicity Dept.

NATIONAL CARBON COMPANY, INC.
WEEKLY PERIODICAL INDEX AND REVIEW
JUNE 8, 1918

Name.....

Dept.....

Page

AMERICAN ELECTROCHEMICAL SOCIETY—Advance Paper
12. The Vom Baur Arc Furnace—J. H. Vom Baur. (Description of a new design of electric furnace particularly designed for melting ferro-manganese or ferro-silicon, or melting down cold charges for steel castings.)

AMERICAN MACHINIST—May 30, 1918.
Employment of Women in Our Industries—W. A. Viall. (The experience of one of the major shops of this country in the employment of women.) 909
Report of A. S. M. E. Committee on Limits and Tolerance in Screw Thread Fits. (A comprehensive report which would interest the machinist.) 913

AUTOMOBILE TOPICS—June 1, 1918.
Thompson Electric Clocks Need No Winding. (Uses dry cells or storage battery.) 355

AUTOMOTIVE INDUSTRIES—May 30, 1918.
Nomography—F. L. Martineau. (Contains bibliography on methods of making alignment charts.) 1045

COMMERCIAL VEHICLE—June 1, 1918.
Baker-R. & L. Offers Complete Line of Electric Industrial Vehicles. (Trade note.) 29

ELECTRICAL WORLD—June, 1, 1918.
Sudden Short Circuits of Alternators—N. S. Diamant. (Thorough and critical exposition of electromagnetic phenomena. Practical methods of calculating characteristics.) 1126
The New Westinghouse Research Building—C. E. Skinner and R. W. E. Moore. (Short general description.) 1132
Protective Lighting for Industrial Plants—D. H. Tuck. (Discussion regarding the intensity and distribution of illumination required, avoidance of glare, available units and most desirable methods of installation.) 1137

ENGINEERING & MINING JOURNAL—June 1, 1918.
The Advent of Modern Mill Mechanism to Nitrate Leaching—D. F. Irvin. (Higher extractions made possible.) 987
Quality of Batesville, Ark., Manganese. (Analysis of different grades given.) 996
The American Zinc Industry. (Organization to promote the welfare of industry considered.) 1018

ENGINEERING NEWS-RECORD—May 30, 1918.
Trucks on Concrete Roadways Distribute Supplies—C. M. Buck. (Handling stores by storage battery tractors and trailers at railway shops.) 1038

IRON AGE—May 30, 1918.
How Erie Is Solving the Housing Problem. (Home-building work being carried out by the General Electric and American Brake Shoe & Foundry Companies.) 1385
Electric Steel for Small Castings—R. F. Flinterman. (Improved operating methods and furnace construction—Heat treated alloy castings in place of forgings—Reversed duplexing.) 1398
The Most Economical Production Lot—E. W. Taft. (Formulas for exact and approximate evaluation—Handling cost of jigs and interest charges of product manufactured included.) 1410
Tin Shortage Compels Regulation of Uses. (Exports of tin plate for containers limited to those for food—Conserving tin in electrical and other manufactures.) 1420

This weekly index lists all the articles of interest to the company which have appeared in technical magazines to which the company subscribes

organization which lists all important articles in practically all of the important trade and technical periodicals, is also subscribed to. Articles which are especially pertinent to the company's activities appearing in the Industrial Arts Index are added to the Weekly Index periodically. The monthly numbers of the Engineering Index section of the Mechanical Engineering Magazine are kept on file in the library, also the annual numbers from 1907 to date. These two indices form a valuable guide to the periodical literature on technical subjects.

Cooperation with the Publicity Department —

The most important work of the library is assisting the members of the Publicity Department in collecting and tabulating information for the various departments of the organization, in preparing articles for trade papers, and other work of similar nature. It is often necessary for the librarian to ask the assistance of the members of the Publicity Department when the information asked for is of an extremely technical nature. Much of this work of supplying information to the laboratories is done by mail. Hardly a day passes but one of the laboratories located outside of Cleveland writes in for technical information. Salesmen on the road are continually asking for data on this or that subject and every effort is made to supply the necessary information. The Employment Departments make good use of the material available.

SPARKS—Current Facts, Figures and Fancy

(Do you know what a Genoese does when he gets a raise in salary? Which is the highest telephone in the world? How much of the world's shipping does the United States produce? Besides answering these questions, the miscellanea here given report a new use for bad odors, a new application of wireless, and a community venture in the newspaper field.—The Editor.)

A telephone at an altitude of 14,960 feet, located in an observatory on the summit of Monte Rosa in Italy, is said to be the highest telephone in the world.

* * *

Telephone officials in England have decided to expend $25,000,000 on automatic telephones in the London district. Some $50,000,000 will be spent altogether on telephone improvements in London.

* * *

The completion of wireless stations in Oxfordshire, England, and in Egypt is provided for by a recent vote of the British House of Commons. This will be the first connection in a wireless chain linking up the entire British Empire.

* * *

On June 30 last the amount of tonnage under construction in the shipyards of the world was 8,017,767. Of this 3,874,143 was being built in the yards of the United States and 2,524,050 in those of Great Britain. No other country was building as much as 300,000 tons.

* * *

The ranks of the capitalists have recently been augmented in an interesting way in Genoa. The longshoremen of that city struck for, and obtained, the equivalent of $6.50 per day. They promptly hired other men to do the work at $2 a day and set about enjoying their blissful leisure with the remaining $4.50.

* * *

The system of blue lights provided on a Brazilian battleship, launched some years ago, was adopted to some extent by the United States for use when near the enemy at night. The reason for this is that blue has a very low range in comparison with light of other colors, red and yellow rays being far more penetrating.

* * *

Recent reports as to the practicability of delivering American coal to Great Britain seem to be unfounded. According to the latest advices the cost of American coal delivered in European ports is at the present time higher than the corresponding price for British coal on account of the higher rates of freight from America.

* * *

A community-owned newspaper is a successful venture in operation at Bellingham, Wash. The residents of the city and adjacent territory have subscribed for a non-dividend-paying certificate in the publishing company, which is not operated for profit. The executive work is done by two trustees and a managing editor, all elected by the certificate-holding membership. The object is to acquire independence in the newspaper field.

* * *

An unpleasant but effective safety device has been developed by the United States Bureau of Mines. It consists of a vapor with an ultra-offensive odor mixed with the air which is forced through the mine for ventilating purposes. This reaches every corner of the mine far more rapidly and effectively than could any other form of danger-signal.

* * *

A substitute for a pilot was developed during the war by utilizing electro-magnetic effect in connection with a cable. The cable is laid on the bottom of the sea, along the course of the safe channel leading to the harbor, and when an alternating current is passed through it, it is possible by means of delicate devices installed on a ship to obtain indications of the presence of the cable, and steer the ship safely through fog or darkness.

* * *

The quantity of water lost by evaporation in the Panama Canal Zone is nearly as great in the four dry-season months as in the whole eight-months period of the rainy season. The record daily loss from Lake Gatun is 0.4 in., in March, 1918. Sixty per cent of the evaporation loss occurs between 8 a.m. and 8 p.m. The loss from surface along the timber-covered margins and the grassy marshes is far less than that from the open sections of the lake.

* * *

Conducting aluminum is a new invention by a Swiss expert. It is produced by putting the ordinary aluminum through a specially patented process, by which it acquires the same mechanical qualities and capacities as bronze, copper and brass, without changing its specific weight. It is expected that its smaller specific weight will permit it to compete favorably with copper and brass, and the fact that it is a conductor will make it particularly in demand in the electrical trade.

* * *

Getting married by wireless while in an aeroplane 2000 feet above the earth is the recent experience of a bridal couple. The minister and the best man occupied one plane and the bride and bridegroom another, while the bridal party below were provided with telephone receivers by means of which they followed the entire ceremony. The best man and the bridegroom acted as pilots, and the minister and the bride operated the wireless sets. The planes flew within 50 to 100 feet of each other.

PERSONALS

I. W. Alexander, of the commercial department of the San Joaquin Light & Power Corporation, has accepted the position of chairman of the Publicity Committee of the Pacific Coast Section, N. E. L. A. The active part taken by Mr. Alexander in the publicity work of the California Electrical Cooperative Campaign as well as his constructive assistance in all N. E. L. A. convention activities has undoubtedly led to this appointment, which will mean much to the electrical industry of the Pacific Coast. The committee which will act under Mr. Alexander consists of Howard Angus, secretary of the California Electrical Cooperative Campaign; F. E. Boyd, in charge of the small motors department of the San Francisco office of the General Electric Company; M. T. Dolman, manager of sales promotion of the Pacific States Electric Company, San Francisco; Carl M. Heintz, of the publicity department of the Westinghouse Electric & Manufacturing Company, Los Angeles; F. S. Myrtle, manager of the publicity department of the Pacific Gas & Electric Company, San Francisco; C. A. Peirson, advertising agent of the Southern California Edison Company, and Robert Sibley, editor of the Journal of Electricity and Western editor of the Electrical World and Electrical Merchandising. The committee under Mr. Alexander's leadership has already planned an important program for bringing the electrical industry of the West to the favorable attention of the public in this region, as well as to Eastern capital.

Herbert Hoover, who returned from Europe recently, is now at his residence in Palo Alto, California.

F. E. Bonner, electrical engineer with the Forest Service, Washington, D. C., has recently been spending some time in San Francisco.

Wm. H. Easton, publicity representative for the Westinghouse Electric & Manufacturing Company at New York City, and **Waldo C. Cole,** commercial engineer for the same company in the Southwest, are among recent San Francisco visitors.

C. E. Heise, district manager for the Westinghouse Electric & Manufacturing Company at San Francisco, and **K. E. Van Kuran,** district manager at Los Angeles, are attending a meeting of the company's district managers at East Pittsburg, Pa.

Ronald T. Strong, formerly with the valuation department of the Portland Railway Light & Power Company, and more recently a lieutenant in the U. S. Navy, has accepted a position as industrial salesman with the Westinghouse Electric & Manufacturing Company, with headquarters in Chicago. He will handle the iron and copper mining customers in northern Michigan.

J. P. Growdon, who left a position as district superintendent with the Northwestern Electric Company at Portland to go to the first officers' training camp, has brought back a most creditable record. He applied at the training camp for the rating of first lieutenant, on completing his training period was assigned at once to the Fourth Engineers, and went with them to France as captain. After earning four stars in his service medal, signifying that he fought in four major offensives, he returns as a major, and unknown to all his friends is wearing both the Distinguished Service Cross and the Croix de Guerre. He was honorably discharged on September 10 and immediately resumed work in the engineering department of the Northwestern Electric Company at Portland.

E. Cantelo White has been appointed manager of the newly-organized lighting department of the Western Electric Company. Mr. White has had wide experience in the electric lighting field, and is well known to the electrical industry as the originator and designer of the Duplexalite line of lighting fixtures.

Calvin W. Rice, secretary of the American Society of Mechanical Engineers, has accepted appointment on the Organizing Committee to plan for the Inter-Professional Conference. It is proposed to hold this conference towards the end of the year, bringing together representatives of the professions to consider inter-professional relations and problems, and to further cooperation. Mr. Rice recently spent some time on the Pacific Coast in the course of an extended trip. He visited the various local branches of the A. S. M. E. throughout the country, with a view to bettering the affiliations.

John B. Fisken, superintendent of light and power with the Washington Water Power Company, Spokane, Wash., has been down to Los Angeles to attend the recent Pacific Coast Convention of the A. I. E. E., acting as chairman of the gathering. Other visitors to the convention from outside cities included **F. M. Feiker,** editorial director, McGraw-Hill Company, New York; **J. H. Danderton,** Boston; **Jasen Carey,** Santa Barbara; **J. F. Dommerque,** telephone engineer, East Orange, N. J.; **W. R. Van Bokkelen,** chief engineer, Coast Counties Gas & Electric Company, San Francisco; **C. F. Benham,** engineer O. & M. department, Great Western Power Company, San Francisco; **L. C. Williams,** O. & M. dept. hydro., Pacific Gas & Electric Company, San Francisco; **D. I. Cone,** eng. dept., Pacific Telephone & Telegraph Company, San Francisco; **C. P. Murray,** San Francisco; **Robert Sibley,** editor Journal of Electricity, San Francisco; **R. W. Shoemaker,** eng. dept., Great Western Power Company, San Francisco; **H. S. Perkins,** San Francisco; **J. Franklin Stevens,** consulting engineer, Philadelphia, Pa.; **E. F. Shindel,** Winslow, Ariz.; **L. M. Klauber,** supt. of electric dept., San Diego Consolidated Gas & Electric Company; **Chas Notley,** Oakland; **H. J. Billica,** Spokane.

Commander Frederick G. Simpson has returned to civilian life and will again take up his work as vice-president and general manager of the Kilbourne & Clark Manufacturing Company, Seattle, makers of radio apparatus. Early in the war he volunteered and was commissioned lieutenant-commander at the Boston navy yard. Shortly after reaching Boston he was promoted and made district radio material officer with the rank of commander. Later he was placed in charge of all radio material activity on the coast from Connecticut to Nova Scotia. Prior to entering the service Commander Simpson won renown as the inventor of the radio telegraph system now being manufactured by the Kilbourne & Clark Manufacturing Company. Commander Simpson states that war conditions brought about development in the radio field that will probably equal the progress that could be reasonably anticipated in twenty years of peace.

E. O. Shreve, San Francisco manager of the General Electric Company, has been elected president of the San Francisco Electrical Development League. The prominent part which Mr. Shreve has played in the electrical activities of the West, and his effective work in promoting the welfare of the industry make his election to this responsible position a source of great satisfaction in local electrical circles. The work of the Electrical Development League has been growing steadily in importance ever since its inception and holds a prominent place among Western activities. The League is to be congratulated on its new president, who has the best wishes of the industry and the whole-hearted support of his co-workers in the work to be accomplished during the coming half-year.

C. B. Campbell of the Rainier Electric Company, Seattle, is making a business trip to Rock Island, Ill.

Gerald B. Rosenblat, electrical engineer of Salt Lake City, Utah, is among recent visitors to San Francisco.

J. T. Huntington, district agent of the Southern California Edison Company, has been transferred from San Pedro to Covina, California.

C. B. Hutchinson, district agent for the Southern California Edison Company at Long Beach, has been appointed district agent at San Pedro.

Frederick G. Cottrell, chief metallurgist with the United States Bureau of Mines, Washington, D. C., is one of San Francisco's recent distinguished visitors.

Robert Sibley, editor of the Journal of Electricity, has been appointed to the Committee on Code of Ethics of the American Society of Mechanical Engineers by President M. E. Cooley.

J. Sandberg, chief engineer of the Stavanger Electric Power Supply of Stavanger, Norway, was an interested visitor at the recent Pacific Coast Convention, A. I. E. E., at Los Angeles.

A. C. Rulofson, one of the founders of the Home Industry League who has recently returned from a six months' trip to Australia, New Zealand, and other points in the antipodes, was the principal speaker at the recent league luncheon.

C. S. Anderson has resigned his position as superintendent of the Clark Electric Power Company of Tooele, Utah, to go with the Western Pennsylvania Power Company. He is now superintendent of the latter company's Butler district.

R. G. Dieck, consulting engineer of Portland and formerly city commissioner in charge of the department of public works, has been appointed secretary to the Industrial Survey Committee which will make a survey of the harbor and industrial facilities.

Leon J. Richardson, Director of the Extension Division of the University of California, has been awarded a medal by the French government in honor of his services during the war, especially the aid given by him to the French educational mission which visited the Pacific Coast last fall.

Professor Vito Volterra of the University of Rome, and one of the most eminent scholars of Italy, will deliver the second series of Hitchcock lectures in the University of California during the period October 6 to 17. His subject will be the Propagation of Electricity and Functional Equations.

F. H. Van Gorder, formerly power apparatus specialist at the New York office of the General Electric Company, has been appointed manager of the Newark Store. Mr. Van Gorder came with the Western Electric Company in the spring of 1907 as a salesman connected with the company's Chicago house.

John Kelly, who for a number of years was New York district manager of the Edison Storage Battery Company, has been appointed general sales manager of the company, with headquarters at Orange, N. J. Mr. Kelly brings to his new position the experience of a long and varied career in the storage battery, electrical vehicle and accessory business.

C. F. Uhden, hydroelectric engineer of Spokane, has been appointed by City Engineer A. H. Dimock of Seattle to take charge of construction of the Skagit river power plant. This appointment has been confirmed by Mayor Fitzgerald. Mr. Uhden is an engineer of extensive experience in problems involved in such construction and was for years chief engineer of the Washington Water Power Company.

Robert W. Clyde has been added to the sales staff of the H. W. Johns-Manville Company in the San Francisco territory, handling the corporation trade. He was formerly with the Passenger Traffic Department of the Southern Pacific Company. During the war he was first lieutenant in the air service, in charge of motor repair and final assembly at the Aviation Repair Depot, Love Field, Dallas, Texas.

James A. McGraw, president of the McGraw-Hill Company, Inc., and **N. A. Bowers,** Pacific Coast editor with the McGraw-Hill Company, recently became members of the Board of Directors of the Technical Publishing Company, taking the places of E. B. Strong and R. J. Davis, resigned. **W. M. Deming,** president and general manager of the company, was elected to fill the office of treasurer in addition.

H. N. Lawrie, for the past seven years chairman of the commission in charge of the Oregon bureau of mines and geology, has been appointed chief of the gold and precious metals division of the American Mining Congress with headquarters at Washington. He has resigned his position on the state commission and is now in Washington. F. A. Olmstead, formerly chemical engineer of the Crown Willamette Paper Company, of Oregon City, succeeds Lawrie as chairman of the state commission of mines and geology.

P. A. Powers, advertising manager for the Benjamin Electric Manufacturing Company, as one of the directors of Chicago's new Engineering Advertising Association has outlined the purpose of the association as follows: "We seek to improve present methods of advertising and selling engineering products by trying to bring the truth to bear upon our problems; by each one laying down his own methods and submitting to friendly criticism; by cooperating in various active efforts, and by the interchange of ideas and experiences."

Ross B. Mateer, formerly in the commercial department of the Great Western Power Company at San Francisco and later with the Southern Sierras Power Company at Riverside, has since the signing of the Armistice, at which time he held a commission as Captain of Engineers, entered the employ of the Philadelphia Electric Company. At Philadelphia Mr. Mateer has introduced into utility service many new ideas of recreational betterment for the employes of the company and in both local N. E. L. A. and A. I. E. E. sections he has aided effectively by serving on publicity committees in forwarding these activities. Readers of the Journal of Electricity have followed with interest the articles he has contributed to its columns from time to time on commercial engineering practice.

Meeting Notices for Electrical Men

(The outstanding features of the activities of the past two weeks are the Pacific Coast Convention of the A. I. E. E. and the Convention of the Northwest Electric Light and Power Association at Seattle. The latter will be reported more fully in a subsequent issue. Among other important gatherings are recent meetings of the California Association of Electrical Contractors and Dealers, and of the San Francisco Electrical Development League.—The Editor.)

San Francisco Electrical Development League

At the meeting of September 15th, the San Francisco Electrical Development League held its semi-annual election of officers. E. O. Shreve, local manager of the General Electric Company, was chosen president, the other officers being: first vice-president, James F. Pollard, Sierra & San Francisco Power Company; second vice-president, C. J. Newbery, of F. E. Newbery Electric Company; secretary-treasurer, J. W. Redpath; members of executive committee, Earle Alexander of Alexander & Lavenson Company, and W. B. Sawyer of U. S. Steel Products Company. Arthur Kempston, chief of the Department of Electricity, San Francisco, was selected to fill a vacancy on the executive committee. The new officers were elected by unanimous vote. In taking up his duties as president, Mr. Shreve gave a brief address of appreciation and promised that the League would continue an active force in the community, as it had been under the leadership of Henry Bostwick, retiring president.

S. J. Lisberger, chairman of the committee appointed to confer with the California Industrial Accident Commission, reported that the Commission is planning a revision of the electrical utilization rules, having invited the appointment of an advisory committee of thirty-five members by various organizations throughout the state. It was decided that the electrical industry is not adequately represented upon this proposed committee, and that more members should be allowed it.

Frank D. Fagan, chairman of the day, introduced Edward H. Brown, manager of the California Industries and Land Show who outlined the program of the all-California exhibition to be held in the Civic Auditorium, San Francisco, beginning October 4th. Mr. Brown drew particular attention to Electrical Day—Saturday, October 11th.

C. W. Banta, assistant cashier, Wells Fargo Nevada National Bank, spoke on "A New Common Law in Industry," showing the development of ethical standards among groups of men, and in industrial organizations. He also presented a brief review of the League of Nations from a business man's standpoint. The commercial problems abroad, he declared, now surpass the political problems in importance.

Oregon Association of Electrical Contractors and Dealers

At a meeting of the Oregon Association of Electrical Contractors and Dealers, held on August 18th, the following firms were represented:

Morrison Electric Co.
Jaggar-Sroufe Co.
E. L. Knight & Co.
R. W. Larsen
NePage McKenny Co.
F. A. Bauman & Co.
Smith McCoy Electric Co.
Beaver Electric Co.
Scott Electric Co.

R. C. Kenney reported that together with McCoy and Sroufe a meeting had been held with Electrical Workers Local No. 48 on August 15th and that the Local had voted against submitting the proposition relative to the demand of electricians for increased wages to the Conciliation Board.

At the meeting of August 25th the Labor Committee, R. C. Kenney, chairman, reported that the Electric Workers' Union refused to treat with the committee as a committee of the Contractor-Dealers' Association, therefore the committee was powerless to negotiate with them.

The meeting of Sept. 8th was called to order by W. O. Fouch, acting chairman. A proposal from the Building Trades Council with regard to contracts was discussed, but no action taken.

The secretary was instructed to see the jobbers regarding attendance at the Electrical High Jinks on Sept. 19th.

There being no further business the meeting was adjourned at 9:30 p.m.

BUILDERS OF THE WEST — LXII

JOHN B. FISKEN

In a commercial age it is almost inevitable that all organizations should tend to become more or less permeated with the commercial spirit. It falls to the lot of a few men steadily to maintain the balance of the professional ideal. To John B. Fisken, chief engineer of the Washington Water Power Company, vice-president of the American Institute of Electrical Engineers and chairman of the Pacific Coast convention of the Institute just passed, this issue of the Journal of Electricity is affectionately dedicated, in recognition of his untiring work for the upbuilding of the Engineering Society in its truest form, and of his devotion to the best ideals of the engineering profession.

Washington Association of Electrical Contractors and Dealers

The Washington Association of Electrical Contractors and Dealers met in Seattle on Sept. 11th for the election of officers, and a business session. The following officers were elected for the ensuing term:

V. S. McKenny, re-elected president; J. J. Aguitter, vice-president; W. M. Meacham, vice-president, Seattle District; H. L. Finling, vice-president, Spokane District; A. J. Gladson, vice-president, Yakima District; R. S. Clarke, vice-president, Bellingham District.

California Association of Electrical Contractors and Dealers

A well-attended meeting of the California Association of Electrical Contractors and Dealers was held on Friday evening, September 12th, at the Palace Hotel, San Francisco. M. A. DeLew, president of the association, opened the session by introducing Robert Sibley, editor of the Journal of Electricity, who presented to the delegate of the Modesto section the cup given by the Journal to encourage full attendance at state conventions. C. E. Osborn received the cup for the contractor-dealers of the Modesto district, who won it by their showing at the recent Santa Cruz convention.

C. B. Kenney made a strong plea for cooperation among the different branches of the electrical industry. M. L. Scobey dealt with the dealer's problems, and C. C. Hillis presented the jobber's side of the question. Mr. Hillis pointed out the increased cost of doing business and advised close study of accounts to prevent leakage. D. E. Harris announced that the jobbers are now in a position to put "Wholesale Only" on their doors, but stated that a number of jobbers must attain

satisfactory distribution of certain lines before they are justified in completely adopting this policy.

Captain Howard Angus, secretary of the California Electrical Cooperative Campaign, outlined the work being undertaken at present, especially in regard to the organization of the Salesmen's Auxiliary. Arthur Rowe interpreted the manufacturer's viewpoint on current merchandising problems; and A. H. Halloran, of the Journal of Electricity, talked on the necessity of service-publicity.

Clyde L. Chamblin, president of the association for the coming year, directed attention to the fact that the increased cost of overhead is likely to cross the line of decreased profits unless adjustment is made. Ralph W. Shearer, of Reno, Nevada, spoke a few words in behalf of the Navada association, of which he is secretary; and F. D. Fagan made an announcement for the California Industries and Land Show in the Civic Auditorium, October 4th to 19th.

Brewster Hall, of Pass & Seymour, congratulated the contractor-dealers of the Pacific Coast on their progressiveness and their successful business methods. H. H. Courtright, of Fresno, predicted an unprecedented sale of electrical washing machines and vacuum cleaners during the next six months. C. F. Butte touched on the subject of jobbers handling industrial orders, contending that this is a proper province of the contractor-dealer. After Frank P. Somers had delivered his cheerful business message from the Santa Clara Valley, the meeting adjourned.

About 125 attended the gathering.

Electric Cooperative League of Los Angeles

At a recent meeting of the officers of the Los Angeles Jovian Electric League, it was decided to change the name of the organization to the Electric Cooperative League of Los Angeles. Plans were laid for four series of ten meetings each during the coming year. At each of these meetings a fiteeen-minute talk on some electrical subject of vital interest to the entire electrical industry will be given in addition to the main speaker of the day. Some of the subjects that will be presented before the League in the first series are:

Modern Merchandising, by G. E. Arbogast.
The Work of the Salesmen's Auxiliary, by D. C. Pence.
The Relationship between the Central Station and the Electrical Industry, by A. W. Childs.

The first meeting will be held October first at which time tickets will be sold for the entire ten meetings of the first session. The ticket sale is to be handled by A. E. Morphy, chairman of the membership committee. The series tickets will include the cost of the luncheon for ten meetings.

The following officers, board of directors, and committee chairmen have been elected for the coming year:

President—Ralph B. Clapp, manufacturers' agent.
First vice-president—A. W. Childs, superintendent of sales, Southern California Edison company.
Second vice-president—G. E. Arbogast, vice-president and general manager, F. E. Newbery Electric Company.
Secretary-Treasurer—Carl M. Heintz, promotion representative, Westinghouse Electric & Manufacturing Company.
Chairman Finance Committee—H. L. Harper, Los Angeles manager, Western Electric Company.
Chairman Membership Committee—A. E. Morphy, secretary Southern California Edison Company.
Chairman Program Committee—R. J. McHugh, district manager, Garnett Young & Company.
Chairman Attendance Committee—C. D. La Moree, manager supply division, Westinghouse Electric & Manufacturing Company.
Chairman Holding Committee—J. G. Pomeroy, manufacturers' agent.
Chairman Reception Committee—H. N. Sessions, commercial engineer, Southern California Edison Company.
Board of Directors—E. L. Lewis, superintendent Los Angeles Railway Corp.; J. O. Case, local manager supply department, General Electric Company; A. E. Peat, treasurer and comptroller, San Joaquin Light & Power Corporation; N. W. Graham, Graham-Reynolds Electric Co.; E. R. Northmore, Los Angeles Gas & Electric Corporation; James Colkitt, John A. Roebling's Sons Company.

Pacific Northwest Engineering Society

Fifty representative engineers of Seattle, Tacoma, Everett and other surrounding cities met and made application to the national board of directors for a local chapter of the American Society of Engineers, covering the state of Washington and Alaska, to be known as the Pacific Northwest Society of the American Association of Engineers. The national headquarters is in Chicago with Prof. F. H. Newell as president.

Temporary officers elected were: S. D. Clinton, cost data engineer, Vulcan Iron Works, president, and J. A. Hopkins, engineer, Seattle Boiler Works, secretary. the following directors were appointed from the membership:

American Chemical Society, A. G. Bissel and Charles A. Newhall; American Institute of Electrical Engineers, A. A. Miller and S. C. Lindsay; American Institute of Mechanical Engineers, Henry Beacher and R. M. Dyer; American Institute of Mining Engineers, A. Slater; American Society of Civil Engineers, J. L. Hall and C. D. Clinton; railway engineering employes, R. H. Jones and F. J. Engle; state engineering employes, Clarence Dohm and J. A. Davis; county engineering employes, Carl Morford and F. G. White; city engineering employes, T. H. Carver and Eben French Chase; educational institutions, Dr. H. K. Benson and C. C. Moore; Pacific Northwest Society of Engineers, J. A. Jackson and D. W. McMorris; Engineers' Club, E. B. Hussey and Frank E. Fowler; at large, J. C. Ralston and Peter Tegtmeier.

Professor Newell has just finished a tour of the states, organizing all civil, mechanical, electrical, mining, and in fact all engineers under one head.

The object of the association is to raise the standard of the ethics of the engineering profession, to influence proposed legislation affecting the engineering profession and to take action necessary to safeguard the profession and to promulgate the association's ideas through proper publicity.

Northwest Electric Light and Power Association

As these forms go to press the convention of the Northwest Electric Light and Power Association at Seattle is still in progress. Among those who are representing California at the gathering are the following: S. M. Kennedy, general agent Southern California Edison Company; B. M. Maddox, manager Mt. Whitney Power & Light Company; A. E. Wishon, assistant general manager San Joaquin Light & Power Corporation; W. S. Berry, sales manager Western Electric Company, San Francisco; D. E. Harris, vice-president and sales manager Pacific States Electric Company; H. R. Noack, Pacific States Electric Company; E. B. Criddle, Southern Sierras Power Company; Robert Sibley, editor Journal of Electricity; J. E. Crilley, Standard Underground Cable Company; Nathan A. Bowers, McGraw-Hill Company.

Electrical Contractors and Dealers' Association of San Francisco

Cooperation with the organization of Oakland electrical contractors, for mutual protection and support, was favorably considered at the regular meeting of the Electrical Contractors and Dealers' Association of San Francisco, on September 19th. Amendments to the by-laws of the association were proposed, providing for non-resident membership for contractors of the East Bay district doing business in San Francisco. Similar privileges for San Francisco contractors are contemplated in the Oakland body.

Joseph M. Carlson, of the Central Electric Company, a member of the conference committee, reported the decisions of a recent meeting under the auspices of the Building Trades Council, at which the committee was represented, adjusting differences of opinion on rules of procedure between architects and general contractors.

Oregon Chapter, American Association of Engineers

W. H. Marsh was elected president of the newly-organized Oregon chapter of the American Association of Engineers at a meeting in the association club rooms in the Tilford building. Other officials named: First vice-president, O. Lauregaard; second vice-president, B. C. Ball; third vice-president, E. G. Hopson; secretary, R. W. Barnes; treasurer, W. C. Ruegnitz. Committee chairmen who are members of the executive board were elected as follows: Publicity, Orrin E. Stanley; entertainment and program, J. C. Stevens; constitution and by-laws, A. H. McKeen; legislative, R. A. Klein; club rooms, J. W. Cunningham; budget, L. T. Merwin; engineers' welfare, C. F. Thomas.

Illuminating Engineering Society

The annual convention of the Illuminating Engineering Society, which will take place in Chicago, October 20th to 23rd, promises a program of exceptional interest.

It is hoped that there will be a good representation from the West, and that those going East at that time will make it a point to stop off in Chicago, if only for one day.

Pacific Coast Gas Association

The Pacific Coast Gas Association at the closing session of its recent annual convention in Los Angeles, elected the following officers: President, A. B. Day, general manager, Los Angeles Gas & Electric Company; vice-president, L. B. Jones, assistant chief engineer, gas department, Pacific Gas & Electric Company, San Francisco; secretary-treasurer, Henry Bostwick, manager San Francisco district, Pacific Gas & Electric Company.

The following were elected directors: John A. Britton, vice-president and general manager, Pacific Gas & Electric Company, San Francisco; W. B. Cline, Los Angeles; C. B. Babcock, San Francisco; W. M. Kapus, Portland; D. J. Young, Tacoma; Frank A. Leach, Jr., Oakland.

Westinghouse Meeting

The San Francisco offices of the Westinghouse Electric & Manufacturing Company were hosts to a number of meter men from the various district offices of the Pacific Gas & Electric Company on Sept. 22 and 23. A dinner at the Engineers' Club on Sept. 22 was followed by a lantern slide lecture of watthour meters by J. E. Bridges. Demand meters were the subject of another lecture on the following day.

The Synchronous Club

The Synchronous Club of Los Angeles held a meeting on Tuesday, September 9th, at the Edison Company office building. N. E. Brown, of the U. S. Electrical Manufacturing Company, spoke on "The How and Why of Electric Motor Manufacture."

Society of Motion Picture Engineers

The fourth annual convention of the Society of Motion Picture Engineers will be held in Pittsburgh, Pa., October 13, 14 and 15. H. M. Wible is chairman of arrangements.

PACIFIC COAST CONVENTION, A. I. E. E.

BY D. I. CONE

The proposal to establish the 220-kv. transmission "buss-bar," to interconnect the great prospective water power developments of California and the load centers, was chief among many subjects of deep interest to electrical engineers that occupied the sessions of the eighth Pacific Coast Convention of the American Institute of Electrical Engineers held at Los Angeles, September 18, 19, 20. This paper, by R. W. Sorenson, H. H. Cox and G. E. Armstrong, was printed in full in the Journal of Electricity, September 1.

The meeting was noteworthy for the value of the papers presented, the thorough discussion, and for the splendid hospitality shown by the Los Angeles section as hosts. The convention meetings were held at the Hotel Alexandria and were presided over by Vice-President John B. Fisken, chief engineer of the Washington Water Power Company, in the absence of President Townley.

A method of determining the order and amplitude of harmonics in voltage wave-forms by indicating instruments was presented by Prof. Leslie F. Curtis of the University of Washington. It is based on the wave-meter of radio telegraphy, modified to apply to power system frequencies and to make allowance for the fundamental frequency.

L. M. Klauber, of the San Diego Consolidated Gas & Electric Company, presented a method, based on the mathematical theory of probabilities, for determining the most economical number of suspension insulator units for a transmission line.

A discussion sent by Capt. W. D. A. Peaslee emphasized the need of improved insulator design.

Prof. Hubert V. Carpenter's paper on the predetermination of synchronous phase-modifier performance was presented, in his absence, by Prof. Wilson of the University of Southern California, who pointed out the application of the well-known Perrine-Baum diagram to the calculation of transmission line performance.

A report on the progress of the Committee on Railway Electrification of the San Francisco section was presented by P. M. Downing, describing its organization and program and emphasizing the challenge to action on account of the present enormous use of fuel oil and the threat of depletion of the supply.

The splendid series of brief papers on "Operating Difficulties," two of which appeared in the Journal of Electricity, Sept. 1, 1919, attracted much discussion and proved a most successful feature.

Various expeditions and special meetings were a feature of the convention:

On Sept. 18, a very enjoyable luncheon was held with the Joint Technical Societies of Los Angeles.

On Friday, Sept. 19, following the afternoon technical session, visits were made to the Torrance automatic substation; the main city substation of the municipal Bureau of Power and Light, and to the Eagle Rock substation of the Edison Company.

Following a technical session Saturday morning, the members were conducted in automobiles to Mt. Whitney Observatory. Prof. Anderson gave an address dealing with electrical and power supply questions presented by the study of the sun. Opportunity was given to inspect the astronomical equipment of the observatory.

Great credit is due to the Los Angeles section, under the direction of C. A. Copeland, chairman, and the Convention Committee for their splendid work.

It was voted to hold a convention in 1920, arrangements of time and place being referred to Vice-President Fisken.

IN MEMORIAM

Hermann Frederick August Schussler, M.A.S.C.E.

Died April 27, 1919

Hermann F. A. Schussler came to California from Europe in 1864 after having spent two years in the study of hydraulic and mechanical engineering at the Zurich and Carlsruhe polytechnic schools. In October, 1864, he entered the service of the Spring Valley Water Works (now Spring Valley Water Company), which supplies water to San Francisco, being advanced to the Chief Engineership in 1866, and serving in that capacity until 1908, after which he gave his time to his private practice as consulting engineer.

During his 42 years of active charge as Chief Engineer of the Spring Valley Water Company, Mr. Schussler designed and constructed all the works of the Water Company, whose aggregate cost during that time reached $20,000,000 and which include such well-known achievements as the Crystal Springs Dam.

Among other things, Mr. Schussler was the first engineer to make use of the thin wall dam.

The last notable structure carried to achievement under his direction is the dam across the Klamath River, California, erected for the California-Oregon Power Company and generally referred to as the "Copco" dam.

In recognition of Mr. Schussler's work as an engineer, the American Society of Civil Engineers appointed a committee to prepare a testimonial. This tribute, summarizing Mr. Schussler's activities in the engineering field, has recently been approved by the members of the society.

Self-Interest in Electrical Development

BY A. E. WISHON

(That no human activity is isolated, and that progress and development in one field have a vital influence on the prosperity of the whole community is the keynote of this message to the West from the assistant general manager of the San Joaquin Light and Power Corporation. It formed part of an address delivered by Mr. Wishon before the San Francisco Electrical Development League on September 22.—The Editor.)

That the accomplishments of the Pacific Coast Section of the National Electric Light Association are receiving national recognition, is evidenced by the fact that today Mr. R. H. Ballard, first president of the Pacific Coast Section, has earned the presidency of the National Electric Light Association, and Mr. John A. Britton, dean of the industry of the West, is chairman of the Public Policy Committee of the national body — controlling the affairs of electrical policy throughout the nation.

During this Western administration of the national organization, an effort is being made to develop the geographic section idea, looking ultimately to the time when the country will be divided into geographic sections, to handle problems of local interest—national problems to be handled through delegates from these sections who will meet once a year in national convention.

The National Electric Light Association Convention is to be held in California next year. It was hoped by many that there would be a joint convention of the National Electric Light Association and the Pacific Coast Section, but this is not to be. It is the thought that the National Electric Light Association will consider strictly national problems, while the Pacific Coast Section will handle problems of local interest as in the past, thus bringing out clearly the necessity for the geographic section, also for the national body to act as a clearing-house for national problems in national convention. The Pacific Coast Section of the National Electric Light Association convention will be held prior to the national convention; it will be no preliminary, but a main event of a different date.

Briefly, as to the plans of the Pacific Coast Section for this year. The organization set up is as follows: John A. Britton is to act as chairman of the Public Policy Committee, Paul M. Downing chairman of the Engineering Committee, K. E. Van Kuran chairman of the Commercial Committee, I. W. Alexander chairman of the Publicity Committee, Tracy Bibbins chairman of the Committee on Cooperation, P. R. Ferguson chairman of the Accounting Committee, and H. N. Sessions chairman of the Membership Committee. In appointing the chairmen of these committees it was definitely understood that the job carried no salary and no particular honor, but very much hard work and responsibility; and when those committee chairmen in turn selected their committee members, that same message was sent out. All committee chairmen are to be present at all executive meetings. What we want is a close working understanding, so that there will be no duplication of effort and no working at cross-purposes.

It was decided at the last executive meeting that as far as possible all convention sessions would be joint sessions, giving the commercial man a chance to hear the engineering problem and the engineer a chance to hear the commercial problem. Furthermore, it was a decision of that same meeting that a subject under discussion be handled from different angles. For instance, the subject of the electrification of railways has the engineering angle, the commercial angle and the public policy angle.

It was further agreed that the different papers brought out through the year should be published through technical magazines, so that there would be plenty of time for study and discussion prior to the convention. These are a few of the plans of this year's work by the Pacific Coast Section.

The greatest problem that faces us today is that of having the public understand what the electrical industry is doing for the nation, but in our opinion this understanding can only be brought about by proving to the individual of this public what the electrical industry is doing for him—what further developments of the electrical industry mean to him in dollars and cents gain, and what a delay in electrical development, due to legislative or other causes, means in dollars and cents loss to his individual business.

We who have studied the problems of the development of the West, know that the West will not develop ahead of its hydroelectric development. The greater portion of the Western territory depends upon hydroelectric pumping for irrigation of its arid lands, if agriculture is to be further extended. If factories are to be located West, cheap power must be obtainable. Any form of legislation, national or state, that delays electrical development, delays the development and prosperity of the West, and any thinking electrical man can sit down and figure out just where any particular business loses in dollars and cents when hydroelectric development ceases. Prove your case to the individual by proving where that individual's pocketbook is hurt, when your own business is hurt, and you will have a convert who will see that your business is allowed to prosper. When electrical development ceases, the prosperity of the contractor, dealer, jobber and manufacturer ceases. When electrical development is encouraged, your business prospers.

This Western country is yet unsaturated electrically and will be for many years to come, and the engineers and commercial men of the different companies have, based upon past experiences, plotted their anticipated load curves several years into the future.

Superimposing these anticipated load curves, we have before us a graphic proof of just what increase in kilowatts we can expect for this territory for the future, if proper encouragement is given to electrical development.

Next, dividing our total electrical investment of today by the total kilowatt load, giving us the unit cost per kilowatt of investment. Taking the cost per kilowatt installed, it is a simple matter to multiply the increased load of any future year by this unit cost and determine the moneys to be spent in electrical development in the West in any future year.

Next, with our standard classification of accounting, as set up by the Railroad Commission, it is a simple matter of mathematics to determine the amount to be invested in generators, dams, transformers, copper, etc., that, under normal conditions, the Pacific Coast will require during any period in the future.

This data is all available. It is a simple matter of putting it together in a graphic plan that will prove to the different interests and to the individual, what electrical development means to him in dollars and cents.

After it has been proved to you what the electrical development of the Pacific Coast means to your individual interests, you will probably begin to use the same proof to others, knowing that hydroelectric development benefits you in dollars and cents; for instance, you will call the attention of your eastern manufacturer to this graphic proof, by showing him just how much his sales increase if electrical development is encouraged and we are allowed to continue under normal conditions, and just how much he will lose in dollars

and cents if hydroelectric development in the West is hampered. He in turn will get the idea and will call the same to the attention of the steel mills, the copper mills and the different manufacturing concerns that sell him the products used in the manufacture of electrical equipment.

There are a thousand and one angles and possibilities to graphic presentation and proof. For instance, I have only called attention to a few points affected by moneys directly spent in electrical development, and have neglected to call attention to the increased payrolls in manufacturing centers, jobbing houses and on construction jobs, made possible by electrical development, and that can be definitely and graphically proven in dollars and cents.

To cover just another angle of the situation, let us leave the direct benefits of construction moneys expended and turn to the effect of those kilowatts of increased load when put into operation. We have our segregated classes of consumers for the past, and if 100,000 kilowatts are to be added in this state for 1921, it is a simple matter to determine approximately what increase would occur in the different classes of consumers—as to how many farms would start, how many factories would start and how many new homes would be connected.

This added business means material sales for the general merchandise interests throughout the state; means added payrolls for the different trades during constructions; means continued production, continued factory payrolls and continual sales to the new population that come into our territory to carry on the operation of the different lines of business started through this hydroelectric development.

In the San Joaquin territory, I can show by my segregated classes of business that under proper encouragement 500 agricultural consumers will be connected in 1920 and that of these consumers, 400 are beginners requiring barns, buildings, fences and general building materials; and if I can show, on this same curve, that during that same period 1500 new homes in town are to be built, do you think I can interest the lumber interests and can prove to them just what their lumber sales would be, based upon this increase? This has already been tried as an experiment, and the lumber man is very much interested.

Another extreme experiment that was tried was proving to an overall manufacturer what it meant to him in the sale of overalls. He is a convert and is today interested in encouraging electric development. Why? Because it means that his sales in overalls will increase in a definite amount of dollars and cents.

This subject of graphic presentation to the individual has been discussed by the engineers, statisticians, commercial men, publicity men and others interested in this year's work of the Pacific Coast Section. We believe that it offers a solution of putting over that story, which we all know to be true, so that it will appeal to and be understood by the individual, and as the mass of individuals constitute the public, it will then be understood by the public—and, our development will be encouraged—not discouraged—by the individual and by this public, because it is of benefit to the individual and to the public.

The public will understand that to delay electrical development on the Pacific Coast delays local and national development in all lines of business; in that financing is necessary to electrical development; in that fair legislation is necessary to finances, and that that is all we are asking for.

HAPPENINGS IN THE INDUSTRY

LECTURES ON HEATING ENGINEERING

By request of Portland Local Union No. 87 of the International Union of Steam and Operating Engineers, a course in heat engineering will be offered in Portland under the direction of O. B. Goldman, professor of heat engineering at the Oregon Agricultural College. A series of eleven lectures will be given, starting October 18, several of which will be delivered by Professor T. A. H. Teeter. The course is being arranged by a committee consisting of Ray Depperman, chief United States Fleet Corporation; A. F. Towner, chief engineer of the Meier & Frank building, and George W. Stitt, engineer and secretary of the local union.

INTERNATIONAL TRADE CONFERENCE

The program of the International Trade Conference being held at Atlantic City September 30 to October 3, by invitation of the Chamber of Commerce of the United States, includes among its topics for consideration, the economic readjustment of commercial and industrial conditions in England, France, Italy and Belgium. This is with a view to arriving at an estimate of the requirements of food, raw material and manufactured articles, to serve as a guide to American business men, manufacturers, producers, bankers, etc., in planning their trade relations in the future.

Finance is another of the general subjects, including foreign exchange and all the forms in which questions of credits may arise.

It is recognized that wars have been due to trade rivalry, and the commercial hostility which leads to armed conflict may probably be a cumulative effect of innumerable irritations of unfairness and discrimination, having an influence in official circles which are in communication and sympathy with the commercial class. These practices are all manifestations of a spirit of hostility which might possibly be lessened by discussion, and a general consideration of unfair competition in foreign trade to see how far the principles of fairness, which have been applied in legislative and administrative regulation to domestic trade, might be applied to international trade.

Fair play in international commercial competition was promoted before the war by international congresses of chambers of congress. It will be promoted likewise by the meeting at Atlantic City, and the event should result in arrangements for future study and solution of international problems in the commercial field.

There is an American committee for every subject, including producers, shippers and economists, meeting from day to day with the foreign delegates. By this method of procedure every foreign delegation will have opportunity to state the needs of his country to the appropriate committee.

The chairman of the delegation from Italy is Guiglielmo Marconi, father of the wireless telegraph.

WIRELESS SERVICE BETWEEN PARAGUAY AND ARGENTINA

An agreement has been signed by the Argentine and Paraguayan governments for the establishment of a wireless telegraph service between the two countries. The installations had already been made, but the initiation of the service has been delayed by the failure of the Argentine government to ratify the convention. While the Paraguayan government approved the convention on November 22 of last year, it was not signed by the proper Argentine authorities until recently. The same rates are to be in force as prevail in the regular telegraph service.

IRRIGATION IN MONTANA

The subject of irrigation is receiving more and more attention in Montana. Recently an investigation trip was made in the Flathead Valley district by business men, farmers and others interested in increased crop yields, under the auspices of the Kalispell Farm Bureau. A number of farms which are irrigated by means of electric power furnished by the Mountain States Power Company were visited. W. B. McDonald, manager of the Kalispell division of the company, accompanied the party and explained the advantages of electric power pumping. It was shown that at an expense of approximately $14.00 per acre (depending on the size of the farm) an electric irrigating system could be installed which would insure an abundant supply of water at all times. It was further shown that the increased crops as a result of the irrigation more than pay for the installation in a single year. In one instance two crops of alfalfa brought the owner $100 per acre.

FOR ELECTRICAL ENGINEERS

The United States Civil Service Commission announces an open competitive examination for junior electrical engineers, for men only. Vacancies in the Bureau of Mines, Department of the Interior, for duty at Pittsburgh, Pa., or elsewhere, at $1,080 to $1,200 a year, with temporary increase of $240 a year granted by Congress, if services are satisfactory, and in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Competitors will not be required to report for examination at any place, but will be rated on the following subjects, which will have the relative weights indicated:

Subjects	Weights.
1. Physical ability	10
2. Education and experience	90
Total	100

Graduation from a four years' course in electrical engineering in a college or university of recognized standing, and at least one year's experience in electrical engineering work outside the college, are prerequisites for consideration for this position.

EMPLOYES PRESENT TESTIMONIAL

Following upon a gift of $100 to every man and woman who had been in the employ of The Holtzer-Cabot Electric Company for ten years or more, a testimonial was presented to the president. It contains an expression of thanks for the generous recognition, and for the good feeling that has always existed between the officials of the company and its employes.

ACCIDENT PREVENTION

A. F. Duffy, manager of the Safety Section, Division of Operation, United States Railroad Administration, has decided to hold the National Railroad Accident Prevention Drive for a period of two weeks, beginning October 18 and ending October 31, along the general lines of the recent successful sectional campaigns of like character.

Intensified safety work on American railroads has attracted the attention of British and Japanese railroad officials who have written to the United States Railroad Administration for information on the subject.

PUEBLO PLACED ON AIR ROUTE

Pueblo, Colo., which is served electrically by the Arkansas Valley Railway Light & Power Company, has been placed on the first mid-western aerial passenger, express and mail route which is to operate between Fort Worth, Texas, and Denver, Colo. The airships will accommodate several passengers and will make the complete trip every day, an airship leaving each city every morning. The trip between cities will be made in twelve hours, or one-third of the time required by trains.

HIGHER PAY FOR ENGINEERS

The American Association of Engineers has taken up the problem of increasing the pay of engineers. The first branch to receive attention was the railroad engineers and the results were more than they even expected, members reported.

The following schedule of salaries has been adopted by the association:

City engineer, annual work, $5000 to $15,000.
City engineer, annual work, $2500 to $10,000.
City engineer, annual work, $1000 to $7500.
City engineer, annual work, $500 to $5000.
Department engineer, $7500.
Division engineer, $7500.
Assistant engineer, $3600.
Instrument man (preferably technical graduate), $2400.
Rodman (high school, 2nd grade), $1500.
Inspector, $1800.
Architect, $5000.
Designing engineer (technical graduate, 10 years' experience), $6000.
Designer (technical graduate, 5 years experience), $4400.
Detailer (technical graduate preferably), $3000.
Tracer (technical high school), $1800.
Draftsman, architectural, $3000.
Draftsman, map or topographic, $2400.
Draftsman, structural, $2400.

Among other things, the association is vigorously supporting the plan for a national department of public works.

VOCATIONAL CLASSES FOR EMPLOYES

Vocational classes were opened in September for employes at the Alameda plant of the Bethlehem Shipbuilding Corporation, under the auspices of the Board of Education. The courses include draughting, machine-shop practice, electric welding, riveting and general electrical work. The Corporation provides free quarters and equipment, the remainder of the expenses being met from federal, state, and city funds.

NEW LABORATORIES OF THE BUREAU OF MINES

The new million-dollar laboratories of the Bureau of Mines, Department of the Interior, in Pittsburgh, Pa., just dedicated, are equipped for the highest grade of research and routine work. Typical coals, gathered from all parts of the country, are analyzed and tabulated in such a manner as to give to the public general information of the coal fields of the country; actual experiments in the combustion of coal take place under experts and their findings are given publication.

There is a complete electrical laboratory where electric mining equipment is tested under schedules issued by the Bureau from time to time as the need of a particular class of apparatus develops. The types of apparatus for which schedules have been issued to date, include the following: Permissible portable electric lamps, permissible electric motors for mines, permissible miner's safety lamps, permissible gas detectors for mines, permissible mine locomotive headlights, permissible electric lamps for mine-rescue service, and permissible flash lamps that are safe for use in explosive mixtures of methane and air.

AUSTRALIAN ELECTRIC POWER PLANT TO BE ENLARGED

The Municipal Tramways Trust of Adelaide, South Australia, an organization which is incorporated and under the control of the municipalities comprising the metropolitan area of Adelaide and which owns and operates the electric street railway system, will shortly ask for bids for the installation of a new 10,000-horsepower electrical unit for its plant. A movement has been started to have the charter of the trust enlarged so as to allow it to furnish electrical power in competition with the Adelaide Electrical Supply Co. (Ltd.), a private corporation which furnishes Adelaide with light and power.

American manufacturers of electrical machinery and equipment should address their inquiries to the General Manager, Municipal Tramways Trust, Adelaide, South Australia.

ILLUMINATION PLANS

The illumination at the California Industries and Land Show, scheduled for October 4th to 19th this year, will be one of the most ambitious undertakings along this line seen in this state. Eighty thousand incandescent lights will burn, the bulbs ranging all the way from tiny fairy lights to large size globes of every conceivable shape and shade.

There will be thousands of feet of electric wiring for the illumination of the various exhibits, with a great spectacular display by one of the electrical companies for the center.

Among other awards there are to be medals for the best exhibits of electrical appliances—a gold medal for the first, a silver medal for the second and a bronze medal for the third. These displays will be divided into electrical cooking appliances, incandescent lamps, etc.; dynamos and motors; heating and other appliances, including flat irons and curlers; electrically operated washing machines; electric dry batteries and storage batteries.

SALES CONFERENCE IN IDAHO

Ideal weather conditions and a large and enthusiastic attendance marked the semi-annual Sales Conference of the Montana Electric Company and the Washington Electric Supply Company, held at Hayden Lake, Idaho, September 15th to 19th, 1919.

Those in attendance as representatives of the associated companies were:

E. W. Anderson, Boise.
E. K. Bacon, Billings.
M. I. Blakemore, Great Falls.
J. Duhan and A. J. Stanbury, Butte.
Millard Sebern, C. M. Wright, H. T. Whitehouse, A. H. Crowell, W. E. Brebner, and J. J. Mullins, Spokane.
H. W. Turner, president.
H. L. Bargion, general manager.
L. F. Philo, general sales manager.

Mr. Philo presided.

Manufacturers in attendance were:

Benjamin Electric Mfg. Co., C. A. Martin.
Bryant Electric Co., W. O. Dahlstrom.
Gould Storage Battery Co., H. A. Borup.
Baker-Joslyn Company, H. H. Manny.
Kellogg Switchboard & Supply Co., F. H. Russell.
H. W. Johns-Manville Co., Geo. A. Saylor, J. H. Roe, Franklin Shuey, G. A. Gregory, W. H. Hoge.
Crouse-Hinds Company, A. E. Vieau, F. H. Gerhart.
Landers, Frary & Clark, Paul W. Quick.
Edison Electric Appliance Co., R. W. Turnbull.
Hurley Machine Company, R. G. Chamberlain.
Geo. Cutter Co., L. A. S. Wood.
Free Sewing Machine Co., C. W. Darby.
Arthur & Fowler Company, Guy Arthur.
Manhattan Electric Supply Co., E. M. Haig.
Westinghouse Electric & Manufacturing Co., B. S. Manuel, C. V. Aspinwall, E. V. Peterson, R. J. Cobban, S. E. Dunn.
Westinghouse Lamp Co., H. D. Howell, R. F. Donaghue, F. R. Hamill.

Awards were made as follows: Champion fisherman (oral), E. K. Bacon; (actual), A. H. Crowell. Winner of golf tournament, Turner Cup, L. F. Philo; runner-up, C. V. Aspinwall.

LUNCH CLUB FOR EMPLOYES

A modern cafeteria and restaurant, seating over three thousand persons and providing well prepared food on a "service at cost" basis, is the latest plan of the Westinghouse Electric & Manufacturing Company in East Pittsburgh.

The first and second floors, seating 2500 people, will be devoted solely to "help yourself" cafeteria service, while the third floor will have a modern table service restaurant, as well as the kitchens and an auditorium seating over 1000 which will be used for meetings of the various organizations.

Only the most modern conveniences of culinary art will be employed. The cafeteria counters will have moving belts to carry the trays of food placed on them, allowing the passing diner to have his hands free to select food. A huge refrigerating plant on the first floor will not only cool all foodstuffs in the refrigerators, but will also provide cold drinking water at the numerous fountains scattered through the cafeterias as well as manufacture ice.

TRADE NOTES

Business Changes Hands —

The Electric Agencies Company, manufacturers' representatives at San Francisco, Los Angeles and Seattle, have been succeeded by the Allied Industries, Inc., with headquarters at 283 Minna street, San Francisco.

New Branch Office —

The Western Electric Company has recently opened a new branch, consisting of a sales office and warehouse, at 334 East Bay street, Jacksonville, Florida. This distributing house has been established for the purpose of enabling the company to give improved service to its customers in the extreme southeastern part of the United States. The house is in charge of Mr. A. H. Ashford.

A full line of electrical supplies and specialties will be carried at this house. This will include pole line hardware, cross arms and other pole line construction material; all inside wiring material; portable sewing machines, vacuum sweepers, washing machines, heating apparatus and all other electrical household appliances.

Agent Appointed —

The Ward Leonard Electric Company of Mount Vernon, N. Y., manufacturers of Ward Leonard Vitrohm resistance units, theater dimmers and electric controlling devices, have appointed Lyman C. Reed, 821 Union street, New Orleans, La., as their selling agent in that territory.

Furnace Order —

After an extensive investigation of the various types of electric furnaces and a visit to the U. S. Navy Yard at Puget Sound, where a six-ton Greaves-Etchell furnace is in operation, the Vancouver Engineering Works, Ltd., Vancouver, B. C., has given an order to the Electric Furnace Construction Company for a Greaves-Etchells furnace.

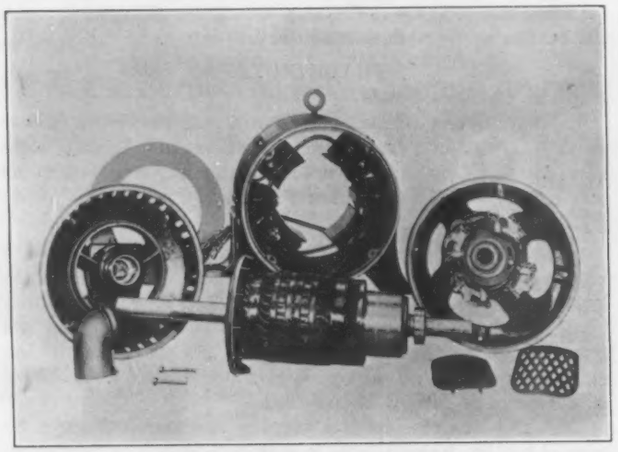
One of the events of the A. I. E. E. Convention at Los Angeles — the dinner given to the wives and daughters of members on Friday evening, September 19th, at the Hotel Alexandria.

LATEST IN EVERYTHING ELECTRICAL

(A recently-introduced line of direct current motors appears among the industrial items of interest here presented, together with something new in condensers, and a convenient and adaptable indicator. The new power plant at the Georgia School of Technology is a recent interesting installation reported by the Westinghouse Company.—The Editor.)

NEW LINE OF DIRECT CURRENT MOTORS

In the new line of commutating pole direct current motors and generators which has just been introduced by the Allis-Chalmers Manufacturing Company, the machines are not only rugged and compact, with excellent operating characteristics, but the many details which contribute to accessibility, reliability and safety have been thoroughly worked out. This line includes the following standard ratings:



Type "E" motor dismantled, 25-hp., 230-volt, 1150-r.p.m. All type "E" motors are of the commutating pole type.

1 Continuous rated (50°C. rise) motors, for applications where the power requirements are definitely known.
2 Normal rated (40°C. rise) general purpose motors.
3 Adjustable speed motors for continuous or intermittent service.
4 Generators and exciters.

For constant speed motors the ratings and speeds are the same as those of 60-cycle induction motors, and they can thus be used interchangeably with induction motors for direct connected applications without changing the method of drive or the ratio of gearing.

Adjustable speed motors, intended particularly for machine tool and similar applications, are provided for 2:1, 3:1 or 4:1 speed range. Generator speeds also correspond to those of induction motors, thus permitting the direct coupling of the machines to form motor-generator sets in various combinations.

The line of ratings now complete covers motors from ½ to 40-kw., while larger sizes are under development.

Cast steel yokes, combining light weight and rigid construction, are used for the larger ratings while the smaller machines, which are of the bi-polar type, have riveted frames.

All machines have ring oiling, dust proof bearings, while the windings are treated to resist oil and moisture. Conduit terminal boxes, regularly supplied, have removable covers, giving ready access to the terminals.

Box type brush holders are adjustable for tension and suitable for either direction of rotation. Each holder can be removed independently with a screw driver or wrench. At least two brushes per stud are used.

The field coils are wound on metal spools, which prevent any movement of the coils, and are protected by an outside layer of enameled wire.

The armature core has the laminations riveted together, permitting the removal of the shaft without dismantling the core or commutator, while for ratings of 20-hp., 850-r.p.m. and larger, the core and commutator are built on a sleeve, so that the shaft can be pressed out of the finished armature without disturbing the windings.

An important feature of the machines is the very thorough ventilating system which has been provided. The air being drawn out by the fan mounted on the rear armature head, fresh cool air flows in through the liberal ventilating ducts and takes up the heat from the iron and windings. This heated air is forced out through openings in the periphery of the rear bearing bracket. With thorough ventilation the internal temperatures are kept low, thus greatly prolonging the life of the insulation.

This new line, which is designated as the Allis-Chalmers Type "E," is completely new throughout, no attempt having been made to re-design old apparatus or to employ parts from any previous machines. The motors are designed for belted as well as direct connected applications and are particularly suited to the exacting requirements of machine tool service.

NEW DEVELOPMENTS IN CONDENSERS

A new and valuable development in steam surface condensers is announced by the Wheeler Condenser & Engineering Company, Carteret, N. J. It is a patented "compartment condenser" that can be cleaned while in service without shutting down the turbine. Any tube or tubes may be temporarily plugged and other repairs made without taking the condenser out of service.

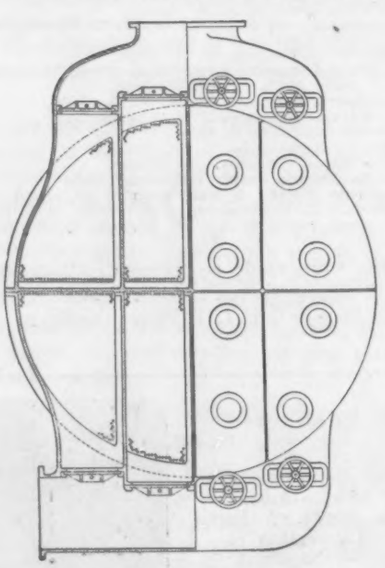


Diagram of condenser, showing the arrangement of the compartments. Each compartment is equipped with a set of valves to control the circulating water.

This condenser enables the engineer to maintain clean condensers, hence a constantly high vacuum, and in addition to increasing output a high vacuum means low fuel consumption and a considerable saving in money.

Also upon installation of this condenser there need be no interference with the operation of the turbine. At the present time it is necessary occasionally to shut down the turbine for a period sufficiently long to give the condenser a thorough cleaning. In such cases this new type will fill a long-felt want. During the wait for an opportune time to clean the average condenser, the vacuum gradually drops, and with the drop coal wastage increases. Sometimes the loss of vacuum amounts to several inches of mercury. Hence the compartment condenser, which can be kept constantly clean regardless of load conditions, will in the long run prove to be a paying investment from the standpoints of both uninterrupted service and coal saving.

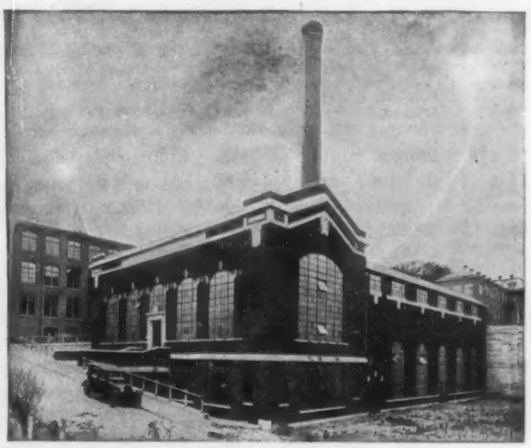
To clean the condenser while the turbine is delivering full power, the operator simply shuts off the water from one compartment, removes the cover, cleans the tubes, replaces the cover, turns on the water again, and then passes on to the next compartment, repeating the operation until the four compartments or the entire condenser is clean. Thus, while one compartment is being cleaned, the other compartments are in full operation, temporarily taking over the entire turbine load.

POWER PLANT EQUIPMENT FOR TECHNICAL SCHOOL

The Georgia School of Technology is having installed a full equipment of Westinghouse electrical apparatus, which will afford the student a special opportunity for both basic and constructional training in contact with highly developed electrical apparatus and devices.

The equipment for the school is a practically complete electrical equipment for a small power plant, consisting of the following apparatus:

One 187-kva., 3-phase, 60-cycle, 220-volt a.c. generator driven by a 150-kw. turbine through induction gear. Also a 125-kva., 80% power factor unit of similar characteristics. For condensing the steam from these two turbines there will be supplied one surface condenser. There will also be supplied one 175-kva. coupled type generator suitable for gas or steam engine drive. For excitation of the above a.c. generators there will be provided one 25-kw. d.c. geared turbine exciter unit. For miscellaneous service there will be supplied one motor generator set consisting of a 3-phase induction motor driving a 50-kw. d.c. generator. For furnishing driving power



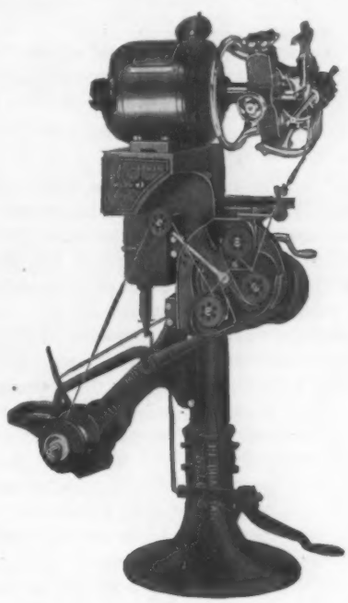
Power plant at the Georgia School of Technology supplied with complete Westinghouse equipment

to auxiliaries and experimental work there will be supplied one 15-hp., two 50-hp. and one 100-hp. squirrel cage induction motors. These motors are all complete with reels, pulleys and suitable auto starters of up-to-date design. Three 50-kva., single-phase, 60-cycle distribution type transformers, 220 volts low tension, 2200 volts high tension, one 2-kva. 50,000 volts self-contained testing outfit. One complete switchboard, including an automatic voltage regulator and necessary control for all the above generators and exciters, together with numerous a.c. and d.c. feeders, are also included in the installation.

This equipment is all thoroughly up-to-date and altogether is an excellent exhibit of a modern power plant and distribution system on a small scale.

ARMATURE WINDING MACHINE

The P. E. Chapman Electric Works, of St. Louis, Mo., announces a much more complete model of the Chapman Adjustable Bipolar Drum Armature Winding Machine. This model in addition to being adjustable in a few minutes for any style and size of random wound bipolar drum armatures



This armature winding machine will wind an especially large amount of wire into armature slots without pounding the wire

and any size of wire from No. 20 to No. 36, has some special features enabling it to wind a very great amount of wire into armature slots without pounding the wire, and also has some unique lead forming and handling features, reducing the labor on this part of armature winding.

Driving motor, controller, turn counter and other necessary parts are all integral parts of the machine; in fact, the machine is complete in itself.

A new automatic dynamometer controlled reel holder and tension device has been perfected, which it is claimed stops all spool troubles and enables quick starting, high speed, great tension and quick stops, so that only about five seconds are required to wind in a coil. This reel holder and tension device are simultaneously adjusted for any sizes of wire by a simple crank, and once adjusted need no further attention until the reel is empty. It is said that the announcement of this device has been held back long enough to prove the machine a success in actual practice, in one case an output of nearly 600 per day being obtained where the estimate was 200 to 250. It is claimed that the output of the machine runs into hundreds of armatures per day on many sizes and kinds of armatures; that the saving over hand winding usually is anywhere from 10 to 30 to 1 or even better. It is claimed that the machine is easy to operate, well and strongly built; that it is useful both in the job shop and in the factory. The machine is also useful for winding field coils, smaller armature coils, etc.

Books and Bulletins

National Electrical Safety Code

The Bureau of Standards has issued a compilation of the proposed changes in Part I of the National Electrical Safety Code. These include the rules for the installation and maintenance of electrical supply stations and equipment, classified under protective arrangements of stations and substations, protective arrangements of equipment, rotating equipment, storage batteries, transformers, induction regulators, etc.; conductors, fuses and other cutouts; and switches and controllers, switchboards and lightning arresters. The proposed changes are not radical, but are aimed to make the rules more complete.

The proposed changes in Part III of the Code were distributed for discussion last year. Proposed changes in Part II will be distributed in the near future. In Part IV there will be little or no change.

Malleable Iron

A booklet on malleable iron is being issued by the American Malleable Castings Association of 1900 Euclid Building, Cleveland, Ohio. This association is an organization of malleable iron founders formed for the purpose of establishing a uniformly high standard of quality by cooperative scientific research and education.

Aside from the various laboratories of its members the Association maintained at Albany a Research Department for investigation and experiment, and for the testing and analysis of the daily output of each member of the Association. Impartial tests were made and the results, together with direction for improvement, where the need was indicated, were forwarded to the respective members. So successful has the work of the Association proved that today it is credited with bringing all its members to a high average quality in their product known as "Malleable Castings."

Having accomplished that result the Association, it is said, will continue these daily tests and analyses for the purpose of grading the product of each member. When a member's product has daily met the requirements of the prescribed standard for a period of three months a "certificate of quality" will be issued to that member, who may designate his output as "Certified" Malleable Castings. These certificates will be renewed quarterly where the quality required is maintained.

The booklet on Malleable Iron and its production, which has been prepared by the Association, is mailed free on request.

University Publications

The College of Agriculture of the University of California publishes, as Bulletin No. 308, "Fumigation with Liquid Hydrocyanic Acid" by H. J. Quayle, and "Physical and Chemical Properties of Liquid Hydrocyanic Acid," by Geo. P. Gray and E. R. Hulbirt. Bulletin 309 is "The Carob in California," by I. J. Condit, and "Nutritive Value of the Carob Bean," by M. E. Jaffa and F. W. Albro.

"Evaporators for Frune Drying," by W. V. Cruess, is Circular No. 213.

Another recent publication is a paper by Elwood Mead —"A Plan for Reclaiming and Peopling the Mesa Lands Bordering the Imperial Irrigation District."

Contributions to the Hydrology of the United States

One of the most important duties of the United States Geological Survey, Department of the Interior, is the investigation of the water resources of the country and the preparation of reports on the best methods of utilizing the available water for public waterworks, domestic, industrial, and live-stock supplies, for irrigation, for desert watering places, and for the development of power. Every year the Geological Survey publishes a number of water-supply papers relating to both surface and underground waters. In addition to the larger water-supply papers it publishes an annual volume consisting of brief contributions to the hydrology of the United States. The volume for 1917 has just been issued as Water-Supply Paper 425. It consists of the following brief reports, each of which was previously published as a separate pamphlet:

A. Ground water in San Simon Valley, Arizona and New Mexico, by A. T. Schwennesen, with a section on agriculture by R. H. Forbes.

B. Ground water for irrigation in Lodgepole Valley, Wyoming and Nebraska, by O. E. Meinzer.

C. Hydraulic conversion tables and convenient equivalents.

D. Ground water in Reese River basin and adjacent parts of Humboldt River basin, by G. A. Waring.

E. Ground water in Quincy Valley, Wash., by A. T. Schwennesen and O. E. Meinzer.

Those who are interested in any of these reports can obtain copies free by writing to the Director, U. S. Geological Survey, Washington, D. C.

Cutler-Hammer Leaflets

One of the new descriptive leaflets recently issued by The Cutler-Hammer Manufacturing Company of Milwaukee, Wis., illustrates the new C-H Hospital Call Switch and shows the method of installing this device in the wall adjacent to the patient's bed.

Another of the new leaflets illustrates the Cutler-Hammer 7720 Duplex Receptacle, which provides two outlets in the space required for one. The small blue print which accompanies this leaflet indicates the location of a number of duplex receptacles in the floor plan of a typical modern home and suggests the many electrical appliances which may be used when sufficient convenient outlet receptacles are provided.

Bureau of Mines

The following list has been compiled by the Bureau of Mines, summarizing the Bureau's publications for July, 1919:

Bulletins —

Bulletin 165. Bibliography of petroleum and allied substances in 1916, by E. H. Burroughs. 1919. 159 pp.

Bulletin 176. Recent developments in the absorption process for recovering gasoline from natural gas, by W. P. Dykema. 1919. 90 pp., 20 pls., 30 figs.

Bulletin 178-A. War gas investigations of the Bureau of Mines, by Van. H. Manning. 1919. 39 pp.

Technical Papers —

Technical Paper 212. The determination of combustible matter in silicate and carbonate rocks, by A. C. Fieldner, W. A. Selvig, and G. B. Taylor. 1919. 22 pp., 1 fig.

Technical Paper 216. Vitiation of garage air by automobile exhaust gases, by G. A. Burrell and A. W. Gauger. 1919. 12 pp.

Technical Paper 217. Saving in coal in steam power plants, by U. S. Fuel Administration. 1919. 8 pp., 1 fig.

Technical Paper 224. Metal-mine accidents in the United States during the calendar year 1917, by A. H. Fay. 1919. 80 pp.

Only a limited supply of these publications is available for free distribution, and applicants are asked to cooperate in securing an equitable distribution by selecting publications that are of especial interest.

Miscellaneous

S. F. Bowser & Company of Fort Wayne, Ind., issue a little folder which illustrates and describes a Bowser Battery Storage System for Lubricating Oil. The folder can be arranged to show one outfit, two outfits, three outfits, or a battery of four tanks, so that the prospect may understand that he can buy as many units as he requires. The folder will show him how the units of any various capacities line up in uniform manner.

A new bulletin from the Allis-Chalmers Manufacturing Company of Milwaukee, Wis., describes and illustrates the "Fairmount Type Crusher."

The Wellman Seaver Morgan Company are distributing a well arranged booklet describing the W-S-M Automatic Ore Unloaders on the Great Lakes. This bulletin is obtainable from the company free on request.

NEW ELECTRICAL DEVELOPMENTS

(Varied activities are reported from the Northwest, including reclamation projects, new incorporations and plans for increasing the electrical supply. Power plant and transmission line construction, together with extensive irrigation plans are features of development in the Pacific Central District, while the Pacific Southwest and Inter-Mountain Districts both report plans for important extensions and improvements in traction and power lines.—The Editor.)

THE PACIFIC NORTHWEST

SPOKANE, WASH.—The Electric Equipment Company has been incorporated here for $25,000 by K. G. Harlan, C. O. Hawkinson and Bert Ferris.

FLORENCE, ORE. — The Florence electric plant owned by G. G. Bushman of Eugene was burned, causing a loss of $10,000. It will be rebuilt.

SALEM, ORE.—The Cascade Irrigation Corporation has been formed here with a capital of $50,000 by O. B. Hardy, Jr., W. L. Smith and W. A. Burdick.

SPOKANE, WASH.—F. E. Martin will erect a power house at the Edgecliff sanitarium at a price of $21,000, the contract having been let by the county commissioners.

MONTESANO, WASH.—The electric generator at the plant of the Northwest Electric & Waterworks, supplying electricity to this place and Elma, was demolished in a recent explosion.

SEATTLE, WASH.—Work is to be started at once by day labor on a slow-burning construction, one-story power house for the Campbell Lumber Company, at 2453 West 54th street, to cost about $6,000.

CASHMERE, WASH. — The Peshastin Ditch Company shareholders held a meeting at which the directors were given authority to enlarge and repair the waterway to such an extent as to provide capacity for at least one inch of water per share.

SPOKANE, WASH.—The Pacific Telephone & Telegraph Company has approved a project covering the rerouting of about three and one-half miles of toll line to a permanent location on a new highway between Lewiston and Pullman, to cost about $8,000.

SEATTLE, WASH.—A contract for the 70,000 cast shoes for the bands of the 78-inch wood stave pipe line now being built by the city municipal power plant at Cedar Falls has been awarded to the Everett Steel Mills of Everett, Wash. The order weighs 245,000 pounds.

SEATTLE, WASH.—A decision to accept a joint bid submitted by John E. Price & Company, Inc., for $1,250,000 city light extension bonds and $790,000 municipal street railway bonds has been reached by the city council, at a price equal to a 6 per cent basis on each $1000 in bonds, plus accrued interest to date of delivery.

HOQUIAM, WASH.—In connection with the project to secure the paving of Simpson avenue to the east city limits, making it the connecting route through Hoquiam for the Olympic Highway, property owners along the street are considering plans for a boulevard lighting system that they believe will make this, Twentieth and Riverside, one of the most attractive drives in the city.

ASTORIA, ORE.—The Pacific Power & Light Company has closed its deal for the purchase of a 15-acre tract of land on Young's Bay upon which it will commence the construction of a large power, light and gas plant immediately. This was the announcement made by head officials of the company and means that Astoria is in line for a great industrial development. Adequate electric energy for all purposes will be provided in the new power plant and a system of distribution installed that will serve every branch of industry in the lower Columbia river district.

KLAMATH FALLS, ORE. — The first move was taken in what may lead to a complete, comprehensive and practical reclamation of the swamp lands of the Lower Klamath lake, when F. Hill Hunter of the Sawmill Engineering and Construction Company made a verbal offer to the directors of the Klamath irrigation district to handle the project and take bonds of the district for the work. Hunter submitted his proposition in writing at a meeting. In general outline Hunter proposes to survey the lands embraced in the district, map out a plan of reclamation, irrigation and drainage and prepare specifications on which the district may proceed to operate and ask for bids.

EVERETT, WASH.—The sum of $2,000,000 would be required to finance the proposed municipal power plant, according to an estimate submitted to the city commissioners by Burns & McDonnell of Kansas City, consulting engineers who were called into consultation with the commissioners on the plan. Of this it is estimated that $1,180,000 would be necessary for the hydraulic power plant on the Sultan river. There would be $410,000 for the construction of an auxiliary steam plant and the remainder would be devoted to the purchase of the present system of the Puget Sound Electric & Power Company. An estimated total of $1,590,000 would be involved in new power plant construction. A bond issue proposition may be submitted with a view of carrying out the program.

BANDON, ORE.—The possibility of a municipal electric power plant for Bandon was the main source of discussion at a recent meeting of the city council and it was concluded that the proposition warranted an investigation. It was arranged for Mayor Topping, a number of councilmen and a committee of citizens to accompany a competent engineer on a trip to the Elk river country in northern Curry county for the purpose of looking over proposed sites that have in the past been considered by private interests. It is well understood that something must be done here if the city is to retain electric lights and power, as the condition of the Bandon Power Company is such, due to the fuel situation, that the service cannot be maintained with certainty for any length of time. The plant is operated at a loss which cannot be continued indefinitely.

SEATTLE, WASH.—With the hope of increasing the city's output of electric power at the earliest possible moment to supplement the present inadequate supply, the Board of Public Works has issued a notice to dealers and manufacturers calling for bids for hydroelectric machinery and other equipment for use at both the Lake Union steam plant and Cedar Falls, estimated to cost about $200,000, funds for the equipment having been appropriated by the city council. Bids for the materials needed at Lake Union will be received up to 10 a.m. October 3, and figures on the Cedar Falls plant equipment up to 10 a.m. October 17. It is proposed to install a 10,000-kw. unit including boilers, generators and all necessary auxiliaries at the Lake Union plant, and to extend the present fireproof building to accommodate the same. Approximately $1,250,000 in bonds has been appropriated for the work contemplated at the auxiliary steam electric station at Eastlake avenue and Nelson place. At Cedar Falls a new 10,000-kw. water wheel and generator is to be added which with the new pipe line from the dam to the power plant will approximate a cost of $750,000. Proposals will be received for the combined unit of turbine and generator set for both the main unit and exciter set. Bidders not wishing to submit figures for the combined unit may quote on either water wheels or generators.

THE PACIFIC CENTRAL DISTRICT

CORCORAN, CAL.—Manager J. B. Carter states that the San Joaquin Light and Power Company will soon spend $80,000 in improvements on the local system.

OROVILLE, CAL.—Plans for the complete irrigation of the Berkeley olive groves of 1000 acres are under way and a contract for 10,000 feet of 6⅛ in. concrete pipe has been let.

BYRON, CAL.—A petition has been issued here for the organization of an irrigation district to be known as the Byron-Bethany Irrigation District, situated in Alameda, San Joaquin and Contra Costa counties.

SAN JOSE, CAL. — The Supervisors have granted permission to the Campbell Water Company to lay a one-inch pipe line across and under the Santa Clara and Los Gatos Road, under the supervision of the County Surveyor.

TAFT, CAL.—About three miles northeast of the Hay lease, a location has been made for the drilling of a new well by the Standard in the H. I. Tupman property. This is on the extreme north side of Ell Hills not far from the plant of the Western Water Company.

COLUSA, CAL.—All preliminary work in connection with the organization of the Glenn-Colusa irrigation district, comprising about 100,000 acres, has been completed. The petition for signatures is now in the hands of the printer and will be circulated immediately.

HAYFORK, CAL.—At a public meeting here, John B. Enos, John Romke and R. W. Cuff were appointed a committee to raise $1000 by public subscription, the money to be used in making a preliminary survey and determining the approximate cost of the proposed Hayfork Irrigation District's project.

MAYFIELD, CAL.—At an adjourned regular meeting of the Mountain View board of trustees, held last week, an ordinance calling a special election for the purpose of voting on a proposition to issue $30,000 worth of the bonds of the municipality to establish an electric light and power system, or purchase the present system owned by the Pacific Gas & Electric Company, was passed.

OROVILLE, CAL.—Construction camps are now being built by the Great Western Power Company in the outskirts of Oroville, preparatory to construction of a second tower line through this section extending from Las Plumas to San Francisco. The new line is being built in anticipation of the completion of the Caribou plant near Belden, which is expected to generate power the latter part of 1920. The new line will be the same as the present one, having steel towers imbedded in concrete.

CALIPATRIA, CAL.—An election was held in Imperial Irrigation District, September 15, to vote on the question of issuing bonds to the amount of $2,000,000 for constructing irrigation canals and works. Said bonds payable as follows: At expiration of six years from date of issue, 4 per cent of whole amount of said issue; at expiration of 7 years, 6 per cent of whole amount of issue; at expiration of 8 years, 8 per cent of amount of issue; at expiration of 9 years, 8 per cent of issue, etc.

RIO VISTA, CAL.—Plans are being completed for the construction of a 22,000-volt power line, costing $20,000, from Hood to Franklin by the Great Western Power Company. Franklin is ten miles south of Sacramento and the distributing lines about town will cover twelve miles. Most of the power will be used for pumping water, which is needed because of the big agricultural development in the Franklin district.

SUCCESS, CAL.—The recent meeting of the South Tule Independent Ditch Company brought highly satisfactory results. It was voted to proceed with a plan to utilize the water of the South Tule river by means of a dam either at the weir near the Reservation, or the Frank Howard place farther down. Hobart A. Webster, E. A. Fisher and Robert Horbach were appointed the committee of investigation, and a preliminary report made by Civil Engineer H. H. Holley of Visalia. The cost will probably amount to $60,000 and a new company offspring for sale of stock in the proposed dam may be formed.

SACRAMENTO, CAL.—Returning from a tour of central and southern counties, State Engineer W. F. McClure announced that he had approved the plans of the Madera irrigation district, whereby 200,000 acres will be brought under irrigation. A gravity type concrete dam 310 feet high and 3900 feet long at the top will be constructed to impound the waters of the San Joaquin river, creating a reservoir with a capacity of one million acre feet. Two small dams near San Diego and four dam sites for the Los Angeles flood control district were inspected. McClure reports great activity throughout the state for conservation, as a result of the dry year.

CORNING, CAL.—Chief Engineer Tempest is again in Corning, working on the Iron Canyon irrigation canal lines. Tempest has a crew of eight men, running the line and making the necessary blue prints. There have been three former surveys which were temporary in their nature, but the work now being done is that of locating the final and permanent line of the main canal from the great reservoir north of Red Bluff, and which runs two and a half miles west of this city. The work of making this permanent survey will require six weeks or two months, during which time the party of surveyors are making their offices in the Woodson building.

MODESTO, CAL.—Attorney J. M. Walthal has been instructed by the Modesto Irrigation District board of directors to prepare petitions to be circulated for signatures for a special election to vote about $2,000,000 in bonds for construction of the Don Pedro project, with a power plant and also for the enlargement of the present canals and extension of the drainage system. The day of the election will be inserted as soon as the board has determined it. Turlock Irrigation District will call a special election to vote over $3,000,000 in bonds as its share in the Don Pedro project, power plant, enlargements of canal and drainage. The two districts are conducting the enterprise jointly.

OAKDALE, CAL.—H. F. Jackson, president of the Sierra and San Francisco Power Company, has written a letter to the Oakdale and South San Joaquin irrigation districts, agreeing to consider the proposal made for the construction of a $3,000,000 reservoir, for which the districts would furnish the bonds, and the power company would pay them off. The proposed reservoir is to be at Donnell's Flat. Operation and maintenance would be borne on equal basis by both parties, and all properties, including water rights, will remain the property of the districts until bonds are paid off. The power company agrees to stop all litigation pending or contemplated against the districts on the water rights on Stanislaus river.

PORTERVILLE, CAL.—Following the announcement that the South Tule Independent Ditch Company, which supplies water to the Success district, had adopted plans for conservation of the amount of water they have appropriated from the Tule River, the officers of the Tule River Water Appropriators' Association have disclosed that they have had under consideration for some time a comprehensive plan of water storage. Aid has been sought of the United States Reclamation Service and of state officials, for drafting of plans for conserving the entire amount of water on which filing has been made, amounting to about 8000 miner's inches. Papers are now being drawn for an organization which will include upwards of 50 individual users and incorporated ditch companies.

THE PACIFIC SOUTHWEST

LONG BEACH, CAL.—An application for a franchise to construct tracks and operate cars in the harbor district has been submitted to the commissioner of public works by the Pacific Electric Company.

PASADENA, CAL.—Service has been inaugurated direct from Pasadena to Sierra Madre by way of Colorado street, and two more cars have been added on the Los Angeles lines, as a result of the recent strike.

LOS ANGELES, CAL.—Fire which broke out in the Pacific Electric Company shops at 7th and Alameda streets did damage estimated at $150,000 before it was checked. The cause of the fire has not been determined.

BLYTHE, CAL.—The sale of $800,000 worth of bonds for completing the Palo Verde system to the county line this fall, and the construction of a railroad along its top, was approved by the Levee Board at its last regular meeting held at Blythe. A. L. Hobson, who promoted the Palo Verde irrigation project, is interested in the proposition.

ALBUQUERQUE, N. M.—Chas. G. Wilfond, president of the Rio Grande Light, Heat and Power Company in the White Rock Canyon, has received the report of Waldo C. Cole, commercial engineer of the Westinghouse Electric Company, on the construction of a great hydro-electric power plant in White Rock Canyon. The report states that the project is feasible, and construction work will be started soon. Plans call for a power and light proposition only. A power dam and a supplementary steam plant will be constructed.

LOS ANGELES, CAL.—Municipal ownership of the Los Angeles Railway Company lines was under discussion by the city council, following recommendation by the finance committee of the body that the question be put to the people. The Railroad Commission has placed a valuation of $30,000,000 upon the street railway lines, but it is understood the company values its system at $40,000,000, and approximately this sum would have to be voted in a bond issue. The municipality would operate the street car lines only within the limits of the city and there is no intention of purchasing the Pacific Electric system.

CALEXICO, CAL.—Assurances of state and national cooperation with the valley in opening the mesa under a supervised settlement plan, and in the construction of a canal and water works to carry an adequate water supply to the present Imperial Irrigation District, are contained in a letter received from Dr. Elwood Mead, chairman of the State Land Settlement Board and consulting engineer to the Secretary of the Interior. It is estimated that $50,000,000 must be raised and spent. He states that if the government raises the money, the reservoir and main canals should be built by the U. S. Reclamation Service.

THE INTER-MOUNTAIN DISTRICT

NAMPA, IDA.—The Nampa Chamber of Commerce is considering the installation of a boulevard lighting system to replace the lights now in use.

RIRIE, IDA.—The Public Utilities Commission has requested the Utah Power & Light Company to extend its lines to serve this town, which has a population of approximately four hundred people.

WESTON, IDA.—A certificate of convenience and necessity to permit the extension of its lines to Weston, Franklin county, has been filed with the Public Utilities Commission by the Utah Power & Light Company.

OGDEN, UTAH.—Work is progressing nicely on the establishment of the Weber Irrigation District, which tract contains approximately 125,000 acres in Weber county. It is expected that this project will require a considerable amount of electric power for pumping.

MISSOULA, MONT.—The remodeling of the Missoula Light & Water Company's power dam in the Missoula river near Milltown will cost about $85,000, according to H. L. Bickenbach, superintendent of the street railway here, who will have charge of the work.

DUBOIS, IDAHO.—The village council has entered into a contract with the Western Electric Company for the purchase of all appliances to be used in the construction of the local electric light and power system. The contract for the construction work will be let in the near future.

LOGAN, UTAH.—Bids for the construction and installation of the ornamental street lighting system for this city were opened by the City Commission on September 12. All bids were rejected on account of being too high. Other contractors are being urged to bid on the work.

YERINGTON, NEV.—The board of directors of the Walker River irrigation district has fixed September 20th as the date for holding an election to decide whether or not the directors shall be given authority to issue bonds for raising money for constructing reservoirs and purchasing land, the necessary amount being $918,500.

BOISE, IDA.—The state department of reclamation has awarded a contract for improvement to be done on the south fork of the Snake river to David A. Saunders, of Idaho Falls. The last legislature appropriated $30,000 for the work. A dike will be built in Madison county by Saunders to prevent spring overflows and deepen the channel of the stream.

LOVELOCK, NEV.—Lack of water for electric power at Lahontan has forced closing of the Rochester Combined, Nevada Packard and Mill City Tungsten mines, and other plants contemplate suspending operations. Only sufficient power is available to furnish electric lighting for Lovelock, Hazen, Fallon and other cities supplied by the Nevada Valleys Power Company.

BOISE, IDA.—Water in Yellowstone Lake in Yellowstone National Park can be directed into the Snake river for irrigation purposes, W. G. Swendsen, commissioner of reclamation, told Governor Davis in a report filed with him recently. Only a preliminary examination of conditions has been made, but the commissioner is of the opinion that approximately 800,000 or 1,000,000 acre-feet of water which is now going to waste in the Missouri river can be brought into Idaho and stored in reservoirs in the upper Snake river valley and diverted to arid lands.

OGDEN, UTAH.—Application of the Uintah Power & Light Company for a preliminary permit for construction of an electrical generating station on the Uintah river, which will furnish four thousand horsepower, has been received by the district engineer of the U. S. Forestry Service, this city. The plant would be situated on the Uintah river in the Ashley forest and distribute power to all of the towns in the Uintah basin. The company already has a small plant in that section. The application is designed to secure priority on the water which will be taken directly from the river without storage. If the permanent permit is granted the right of occupation for fifty years is granted.